SRA
MATHEMATICS
LEARNING SYSTEM TEXT

SRA MATHEMATICS LEARNING SYSTEM TEXT

M. Vere DeVault
Professor of Curriculum and Instruction
University of Wisconsin

Herbert J. Greenberg
Chairman, Department of Mathematics
University of Denver

Helen Frehmeyer
Classroom Teacher and
Educational Consultant

Stanley J. Bezuszka
Director
Boston College Mathematics Institute

SRA

SCIENCE RESEARCH ASSOCIATES (CANADA) LIMITED

Toronto, Chicago, Palo Alto
Henley-on-Thames, Sydney, Paris

Printed in Canada

CONTENTS

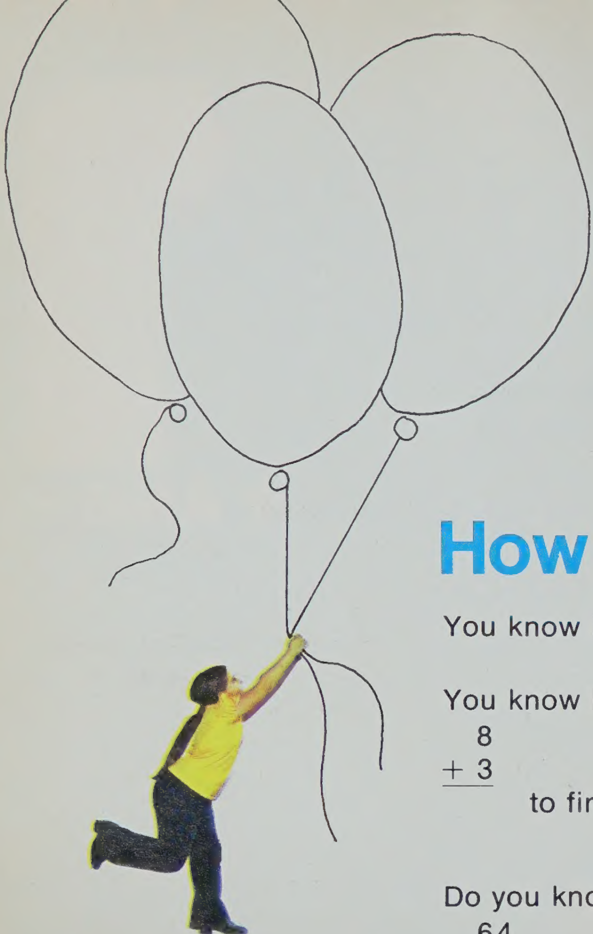
1 + and -

2 multiplication

3 addition

1

+ AND −



How many?

You know how to count to find how many.

You know how to add

$$\begin{array}{r} 8 \\ +\ 3 \\ \hline \end{array}$$

to find how many in all.

You know how to subtract

$$\begin{array}{r} 14 \\ -\ \ 9 \\ \hline \end{array}$$

to find how many remain.

Do you know how to add

$$\begin{array}{r} 64 \\ +\ 27 \\ \hline \end{array}$$

to find how many in all?

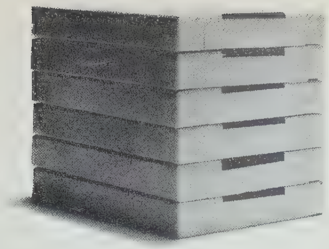
Do you know how to subtract

$$\begin{array}{r} 45 \\ -\ 29 \\ \hline \end{array}$$

to find how many remain?

You will know.
That is
YOUR GOAL
You can do it!

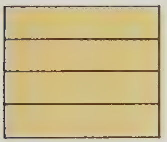
Bill looked.
He saw 4 + 2 boxes.
6 in all.



Sue looked.
She saw 3 + 3 boxes.
6 in all.

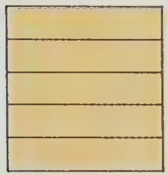
Most numbers have more than one name.
4 + 2 is one name for 6. 3 + 3 is another.

1. Rename 4.



$4 = 2 + 2$
$4 = 3 + \underline{?}$
Find one more name for 4.

2. Rename 5.

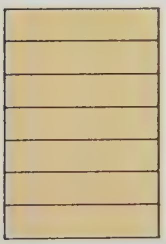


$5 = 2 + \underline{?}$
Find two more names for 5.

3. Rename 6.

$6 = 0 + \underline{?}$
$6 = 2 + \underline{?}$
Find two more names for 6.

4. Rename 7.



$7 = 2 + \underline{?}$
$7 = 5 + \underline{?}$
Find two more names for 7.

5. Rename 8.

$8 = 4 + \underline{?}$
$8 = 3 + \underline{?}$
$8 = 2 + \underline{?}$
Find three more names for 8.

6. Rename 9.

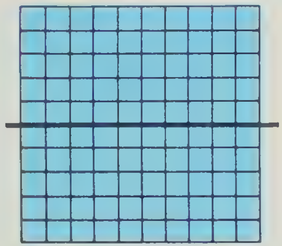
$9 = 7 + \underline{?}$
$9 = 6 + \underline{?}$
$9 = 5 + \underline{?}$
Find three more names for 9.

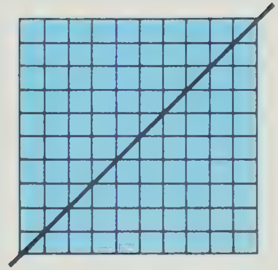
Put your paper under the first row. Add the numbers. Write the answers, or sums, on your paper. Fold your writing under. Put your paper under the second row. Write the sums on your paper. Keep going. You will have a chart of your own. Look for patterns.

	0 column	1 column	2 column	3 column	4 column	5 column	6 column	7 column	8 column	9 column
0 row	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9
1 row	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9
2 row	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9
3 row	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9
4 row	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9
5 row	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9
6 row	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9
7 row	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9
8 row	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9
9 row	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9

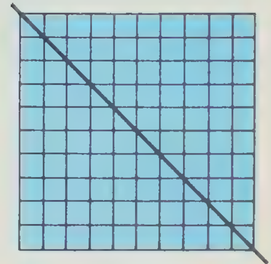
TALK ABOUT THIS PAGE

This is a tiny chart. It has the same number of □s as the number of sums you completed. It has the same number of rows and the same number of columns.

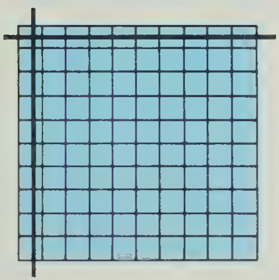




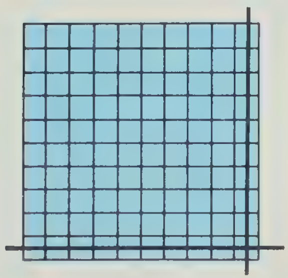
1. Draw a line like this on your chart. What do you see?



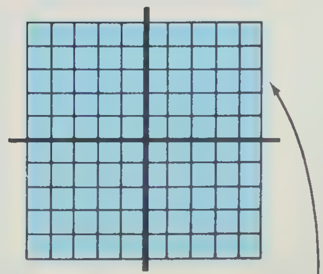
2. Draw a line like this on your chart. What do you see?



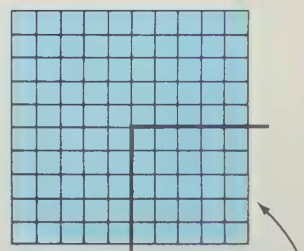
3. Draw two lines like this on your chart. What do you see?



4. Draw two lines like this on your chart. What do you see?

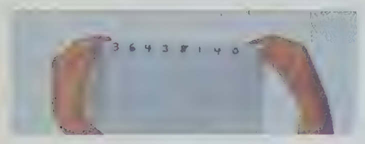


5. Draw two lines like this. Can you find another part that looks like this part?



6. Some people think the addition facts in this part are the hardest to remember. What do you think?

Don't copy. Put your paper under the first row. Write the sums on your paper. Fold your writing under. Put the fold under the second row. Write the sums.

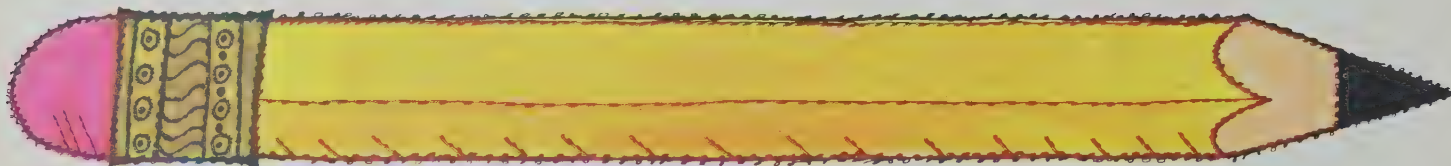


Every time you finish a row, fold your writing under.

ADD

Look at the chart you made. Can you find these sums on your chart?

	a	b	c	d	e	f
1.	1 + 2	3 + 3	4 + 0	2 + 1	4 + 4	0 + 1
2.	0 + 3	2 + 4	1 + 1	3 + 0	4 + 3	2 + 2
3.	4 + 1	3 + 1	0 + 2	1 + 4	3 + 4	4 + 2
4.	1 + 3	0 + 0	1 + 0	2 + 3	3 + 2	2 + 0



NOW ADD THESE

	a	b	c	d	e	f	g	h
5.	8 + 2	6 + 2	8 + 4	9 + 1	7 + 4	5 + 3	6 + 0	7 + 2
6.	6 + 3	8 + 1	7 + 3	6 + 4	5 + 2	9 + 3	5 + 4	7 + 1
7.	8 + 0	9 + 4	5 + 1	8 + 3	9 + 2	7 + 0	6 + 1	9 + 0

Can you find these sums on your chart? Where?

1. Bill had 9.
Jim had 9.
How many in all?

2. Bill lost 7.
Jim lost 8.
How many lost in all?

3. Bill found 6.
Jim found 7.
How many found in all?

4. Jill bought 8.
Ann bought 8.
How many bought in all?

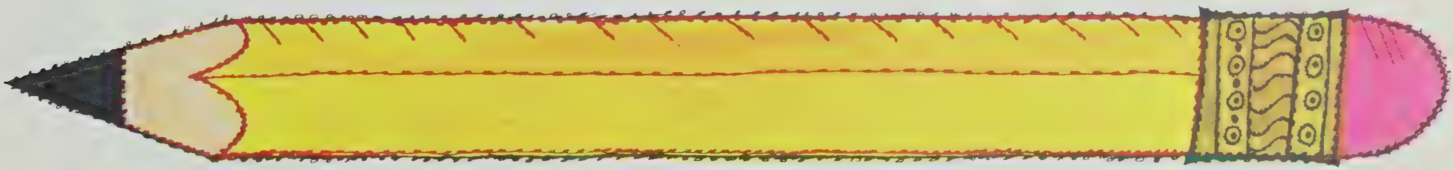
5. Jill returned 5.
Ann returned 3.
How many returned in all?

6. Jill used 4.
Ann used 5.
How many used in all?

7. He made 7.
She made 7.
How many made in all?

8. He made 8 more.
She made 5 more.
How many more made in all?

9. He sold 8.
She sold 9.
How many sold in all?



Some people think the next addition facts are hard. Some people think they are easy. Put your paper under the problems. Write the sums.

	a	b	c	d	e	f	g	h
10.	$\begin{array}{r} 7 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 6 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 7 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ +\ 9 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ +\ 8 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 5 \\ \hline \end{array}$
11.	$\begin{array}{r} 9 \\ +\ 9 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ +\ 8 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 6 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 8 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ +\ 6 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 7 \\ \hline \end{array}$

Do you think they are hard?

Don't copy the facts.
Use the folded paper idea.
Write the sums.
Bet you can add these in a hurry.

try it

	a	b	c	d	e	f	g	h
1.	2 + 2	3 + 3	4 + 4	5 + 5	6 + 6	7 + 7	8 + 8	9 + 9
2.	9 + 0	8 + 0	7 + 0	6 + 0	5 + 0	4 + 0	3 + 0	2 + 0
3.	0 + 1	9 + 1	6 + 1	5 + 1	8 + 1	4 + 1	7 + 1	3 + 1

now add these

Watch carefully. There may not be as much work as you think.

	a	b	c	d	e	f	g	h
4.	7 + 5	5 + 7	9 + 5	5 + 9	6 + 5	5 + 6	8 + 5	5 + 8
5.	6 + 8	8 + 6	7 + 6	6 + 7	9 + 6	6 + 9	5 + 7	7 + 5
6.	7 + 9	9 + 7	7 + 8	8 + 7	8 + 9	9 + 8	0 + 9	9 + 0

Get out your chart again. Where can you find most of the sums in rows 4, 5, and 6?

You know which addition facts are easy. You know which ones are hard. Make a list of the hard ones. Take some extra time. Practise them.

TIME OUT

Let's find out about your skill with addition facts. Work first for the right answer, then for speed.

SET 1

	a	b	c	d	e
1.	5 + 5	4 + 5	3 + 4	2 + 3	4 + 3
2.	3 + 3	4 + 2	5 + 3	4 + 4	1 + 4
3.	5 + 2	1 + 1	0 + 4	5 + 1	2 + 5

SET 2

	a	b	c	d	e
1.	6 + 2	4 + 7	2 + 9	3 + 6	3 + 5
2.	4 + 6	2 + 7	8 + 3	5 + 9	4 + 5
3.	8 + 4	3 + 9	5 + 7	4 + 9	8 + 2

SET 3

	a	b	c	d	e
1.	9 + 4	8 + 2	9 + 3	4 + 8	5 + 4
2.	9 + 5	3 + 7	5 + 8	7 + 3	9 + 3
3.	7 + 4	8 + 3	2 + 6	3 + 8	9 + 1

SET 4

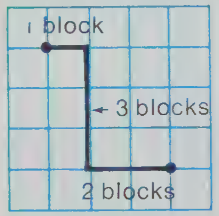
	a	b	c	d	e
1.	8 + 9	6 + 6	8 + 7	9 + 9	9 + 6
2.	7 + 7	9 + 8	8 + 6	8 + 5	7 + 8
3.	6 + 8	7 + 9	8 + 8	6 + 5	7 + 6

1

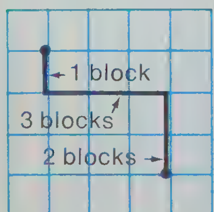
Jan and Jon could never agree.

Sometimes brothers and sisters are like that.

Jan took this path to school.



Jon took this path to school.

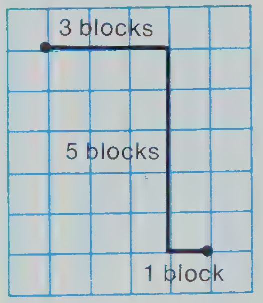


Did one walk farther than the other?

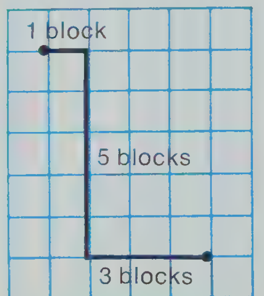
2

They went to their aunt's house.

Jan went this way.



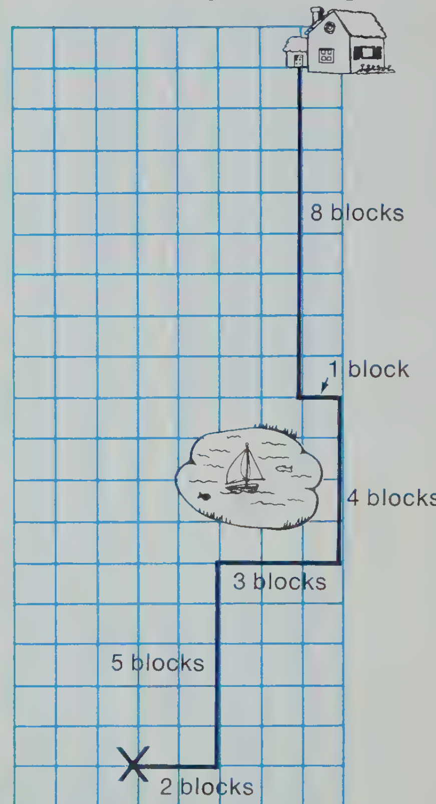
Jon went this way.



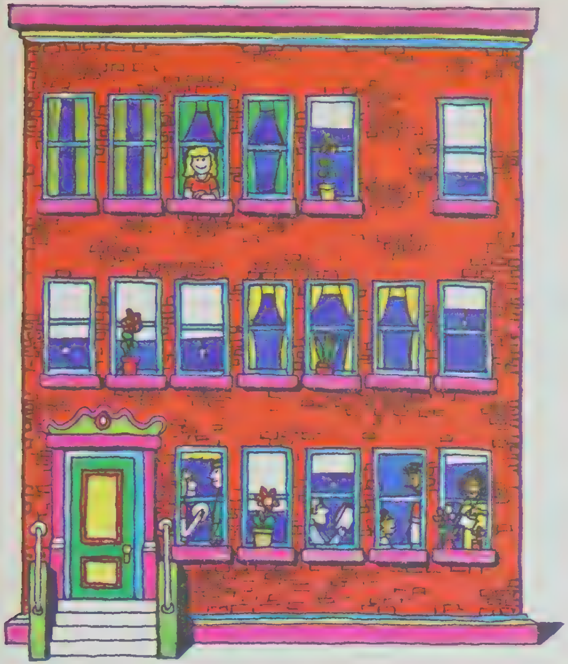
Did one walk farther than the other?

3

Once their mother said they must go together. They were going to a friend's house. Here is a map of their path. They started at X. How many blocks did they walk to get there? How many blocks did they walk to get home?



Make a map showing where you live and your path to school. How far do you go to get to school?



Maggie lives in a three-storey apartment building. She lives on the third floor.

1. How many steps?
   4 to the front door
   9 to the 2nd floor
   9 to the 3rd floor
   How many steps in all?

2. How many windows?
   5 on the 1st floor
   7 on the 2nd floor
   6 on the 3rd floor
   How many windows in all?

3. How many people?
   6 on the 1st floor
   9 on the 2nd floor
   5 on the 3rd floor
   How many people in all?

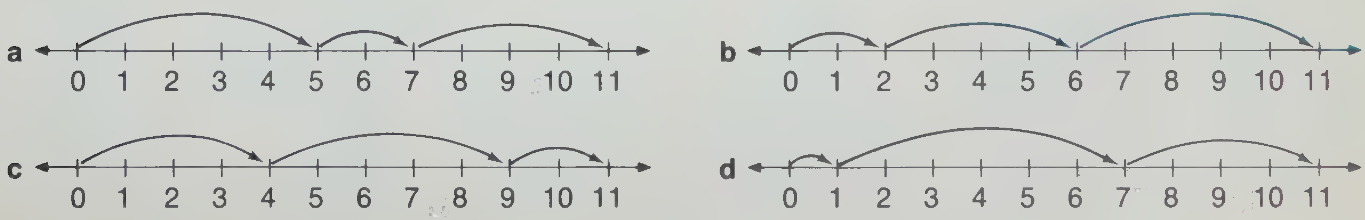
4. How many rooms?
   5 on the 1st floor
   6 on the 2nd floor
   4 on the 3rd floor
   How many rooms in all?

5. How can you add 3 numbers? Think as you add these.

$$\begin{array}{r} 5 \\ 2 \\ +\ 4 \\ \hline ? \end{array}$$

These first?
Or these first? Does it make any difference?

6. Write the addition sentence that is shown on each number line.



Three fellows found three cubes. They got ready for a game. They taped the numeral 1 on one face of the cube, 2 on another face, 3 on another, 4 on one, 5 on one, and 6 on the last face. One fellow rolled the cubes and served as judge. The others watched the three numbers that rolled faceup. The judge decided who wrote the sum of the numbers first. See how fast you can write the sums for each turn.

Does it matter which two numbers you add first?

The girls thought that game was too easy. They changed the numerals. They put the numerals 4 to 9 on each cube—4 on one face, 5 on another, and so on. Then they rolled the cubes and quickly wrote the sums. See how fast you can write the sums for these.

Get together with some friends. Try the game for yourself.

1. 7 came in.
5 went out.
How many remain?

2. 9 chairs put up.
4 chairs taken down.
How many remain?

3. I had 8.
I lost 7.
How many remain?

4. 9 were in a tree.
3 flew away.
How many remain?

5. 11 jobs to do.
8 jobs got done.
How many remain?

6. 5 people came.
0 went away.
How many remain?

SUBTRACT

	a	b	c	d	e	f	g	h
7.	16 − 7	14 − 7	12 − 6	8 − 6	13 − 5	15 − 7	14 − 6	13 − 7
8.	12 − 4	17 − 9	11 − 7	18 − 9	10 − 3	16 − 8	11 − 4	12 − 8

Keep a record of your mistakes.
You may find you often miss the same fact.
You'll then know what to practise most.

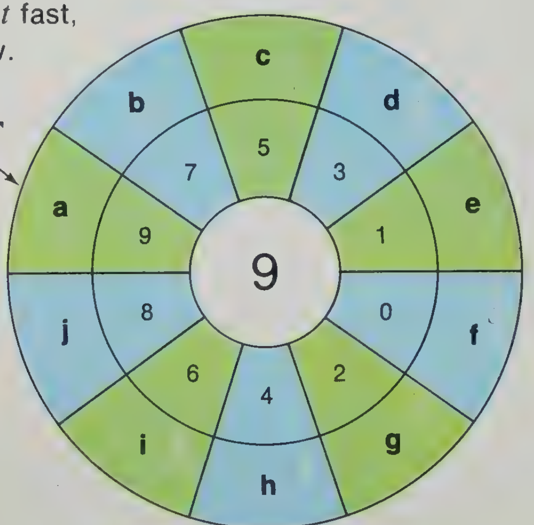
PATTERNS ARE FUN

They also may save you some work.
Find the answers.
Look for patterns.

	a	b	c	d	e	f	g	h
1.	11 − 9	12 − 9	13 − 9	14 − 9	15 − 9	16 − 9	17 − 9	18 − 9
2.	2 + 9	3 + 9	4 + 9	5 + 9	6 + 9	7 + 9	8 + 9	9 + 9

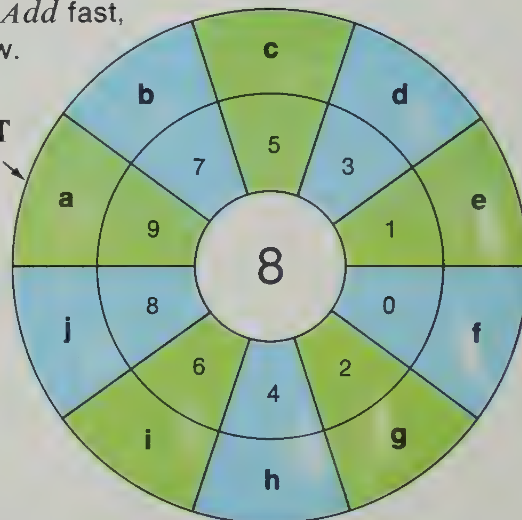
3. Let the wheel go.
Subtract fast,
not slow.

START HERE



4. Round and around
we go. *Add* fast,
not slow.

START HERE



5. He had 12 pennies.
He spent 4.
How many remain?

6. 14 problems to do.
8 got done.
How many remain?

7. She bought 11.
She took back 3.
How many remain?

How good are you at subtraction? Let's check.

SET 1

	a	b	c	d	e
1.	$5 - 2$	$8 - 4$	$7 - 2$	$9 - 3$	$7 - 5$
2.	$6 - 4$	$8 - 3$	$5 - 5$	$6 - 3$	$7 - 4$
3.	$8 - 5$	$8 - 2$	$9 - 4$	$7 - 3$	$0 - 0$

SET 2

	a	b	c	d	e
1.	$12 - 7$	$10 - 9$	$11 - 7$	$13 - 8$	$10 - 7$
2.	$12 - 8$	$11 - 8$	$12 - 9$	$11 - 9$	$14 - 9$
3.	$10 - 8$	$10 - 6$	$13 - 9$	$15 - 9$	$11 - 6$

SET 3

	a	b	c	d	e
1.	$11 - 2$	$15 - 6$	$13 - 5$	$12 - 3$	$13 - 4$
2.	$11 - 5$	$11 - 2$	$11 - 6$	$10 - 2$	$13 - 6$
3.	$11 - 3$	$12 - 5$	$11 - 4$	$14 - 5$	$10 - 4$

SET 4

	a	b	c	d	e
1.	$15 - 6$	$18 - 9$	$16 - 7$	$14 - 8$	$17 - 9$
2.	$15 - 8$	$14 - 7$	$16 - 9$	$15 - 7$	$12 - 5$
3.	$13 - 8$	$17 - 8$	$13 - 7$	$16 - 8$	$14 - 6$

Having trouble with subtraction?
Let addition help.

$15 - 8 = ?$ THINK

What number plus 8 equals 15?

$$\begin{array}{r} 13 \\ -\ 7 \\ \hline ? \end{array} \quad \text{THINK} \quad \begin{array}{r} \blacksquare \\ +\ 7 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 14 \\ -\ 5 \\ \hline ? \end{array} \quad \text{THINK} \quad \begin{array}{r} \blacksquare \\ +\ 5 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 14 \\ -\ 6 \\ \hline ? \end{array} \quad \text{THINK} \quad \begin{array}{r} \blacksquare \\ +\ 6 \\ \hline 14 \end{array}$$

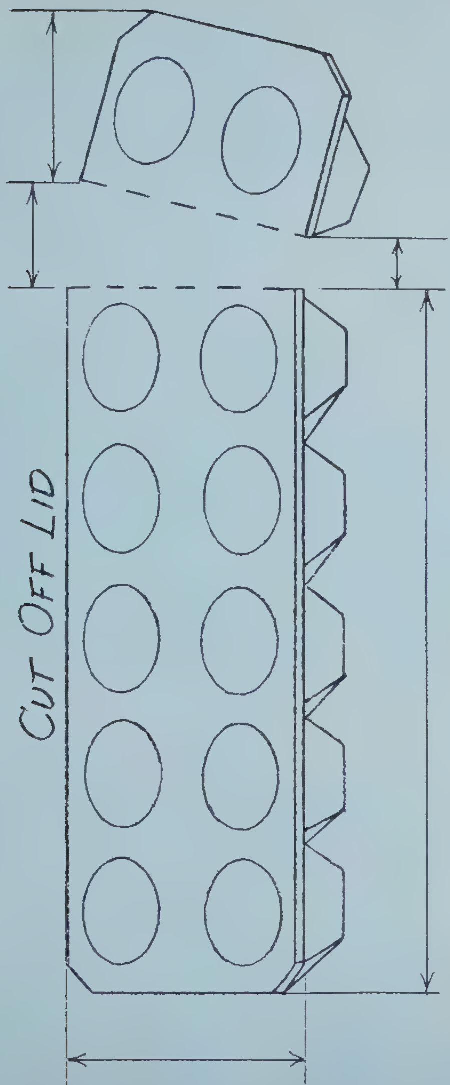
Subtract. If you have trouble, think addition.

	a	b	c	d	e	f
1.	$10 - 8$	$12 - 4$	$15 - 6$	$17 - 8$	$14 - 8$	$13 - 6$
2.	$11 - 7$	$13 - 4$	$9 - 5$	$7 - 6$	$6 - 2$	$2 - 2$
3.	$8 - 7$	$6 - 5$	$5 - 3$	$5 - 4$	$11 - 8$	$13 - 9$
4.	$10 - 6$	$12 - 5$	$11 - 3$	$10 - 7$	$12 - 9$	$10 - 5$

Do these.
Look at the sign.

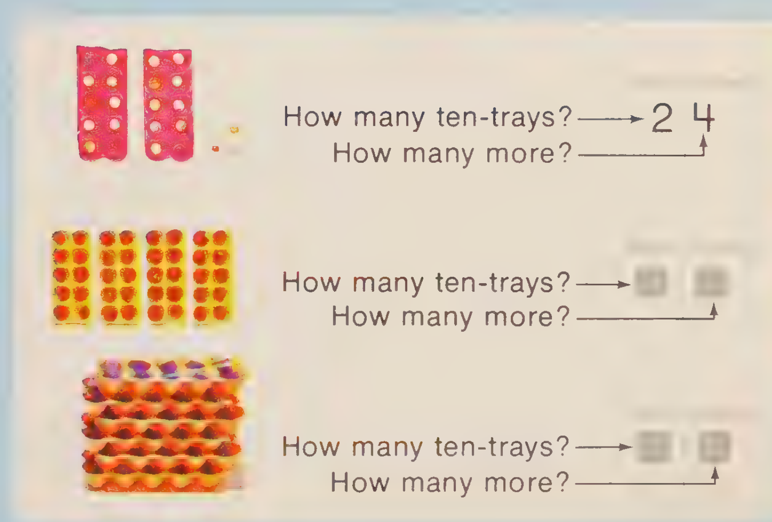
WATCH OUT!

	a	b	c	d	e	f	g	h
5.	$9 + 4$	$12 - 7$	$7 + 3$	$14 - 5$	$5 + 9$	$15 - 8$	$6 + 3$	$16 - 7$
6.	$8 + 3$	$4 + 9$	$15 - 7$	$14 - 9$	$10 - 3$	$4 + 7$	$11 - 9$	$4 + 8$



THIS IS A TEN-TRAY

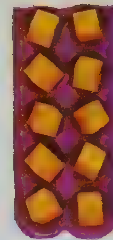
YOU CAN MAKE IT BY GETTING AN EGG CARTON (WITHOUT EGGS IN IT). CUT OFF THE LID. CUT OFF TWO OF THE CUPS AT ONE END. THIS TEN-TRAY HOLDS TEN COUNTERS. THE COUNTERS CAN BE ANYTHING THAT WILL FIT. THE TEN-TRAY CAN HELP YOU UNDERSTAND HOW NUMBERS OPERATE.



1. If you had 90 counters, how many ten-trays could you fill?
2. If you had 10 counters, how many ten-trays could you fill?
3. If you had 9 counters, how many ten-trays could you fill?
4. If you had 19 counters, how many ten-trays could you fill?
5. If you had 100 counters, how many ten-trays could you fill?

How many ten-trays?

Add 1 more ten-tray.
But no more.



How many in all?

	3 tens 0 ones
+	1 ten 0 ones
	4 tens 0 ones

← How many ones?

How many tens?

tens	ones	
3	0	
+ 1	0	
4	0	in all

	a	b	c	d	e	f	g
1.	10 + 10	20 + 10	30 + 20	40 + 10	30 + 30	80 + 10	10 + 30
2.	40 + 20	40 + 30	50 + 10	60 + 20	70 + 10	20 + 40	30 + 20
3.	70 + 20	50 + 30	60 + 10	40 + 40	20 + 20	50 + 20	30 + 60

2 candy bars for 10 cents each. How many tens?
5 pencils for 10 cents each. How many tens?
How many cents in all? How many tens in all?

tens	ones	
2	0	
+ 5	0	
7	0	cents

1. 2 boys, 10 fingers each.
   2 girls, 10 fingers each.
   How many fingers in all?

2. 3 boxes, 10 pencils in each.
   5 boxes, 10 pencils in each.
   How many pencils in all?

3. 3 red balloons, 10 cents each.
   3 blue balloons, 10 cents each.
   How many cents in all?

4. 3 boxes, 10 cookies each.
   6 bags, 10 cookies each.
   How many cookies in all?

5. You have 20.
   I have 30.
   He has 10.
   How many in all?

tens	ones
2	0
3	0
+ 1	0
■	■

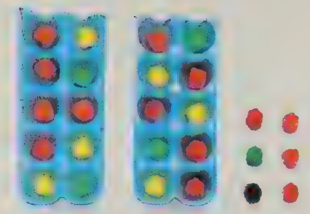
6. He has 10.
   You have 20.
   I have 30.
   How many in all?

tens	ones
1	0
2	0
+ 3	0
■	■

7. Look at the numbers you added in the last two problems. Are they the same? Are they in the same order? Are the answers the same?

	a	b	c	d	e	f	g
8.	3 0	1 0	7 0	5 0	1 0	6 0	3 0
	3 0	3 0	1 0	2 0	5 0	1 0	4 0
	+ 1 0	+ 4 0	+ 1 0	+ 1 0	+ 2 0	+ 1 0	+ 2 0
9.	2 0	6 0	5 0	4 0	3 0	4 0	2 0
	4 0	2 0	3 0	2 0	1 0	1 0	3 0
	+ 3 0	+ 1 0	+ 1 0	+ 1 0	+ 3 0	+ 2 0	+ 4 0

How many ten-trays?
How many more?



Now *add* 1 ten-tray.
And two more.

How many ones?
How many tens?
How many in all?

Start here

	2 tens 6
+	1 ten 2
	? tens ?

How many ones?
How many tens?

	tens	ones
	2	6
+	1	2
	3	8 in all

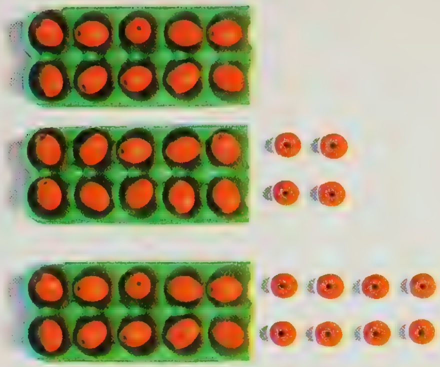
Get ready to add.

1.

	tens	ones
	4	4
+	2	3
	6	7

First write how many ones.
Then write how many tens.
Now you know how many in all.

	a	b	c	d	e	f	g
	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones
2.	63 + 32	37 + 10	25 + 24	32 + 25	76 + 10	52 + 17	27 + 31
	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones
3.	59 + 20	33 + 56	25 + 50	11 + 88	38 + 30	33 + 45	81 + 16



How many ten-trays?
How many more?

Here's 2 tens 4.

Now *add* 18 more.

Add 1 ten 8.
Are there 3 tens and 12 more?
Are you sure?
Think about the 12. Could you take 10 of them and fill a tray?
Now how many ones? How many tens?
How many in all?

THAT IS WHAT YOU THINK

2 tens 4
+ 1 ten 8
3 tens 12

How many tens and ones in 12?
How many tens?
How many in all?

THIS IS WHAT YOU WRITE

tens	ones
2	4
+ 1	8
1	2
3	
4	2

Write **t** for ten and **o** for ones.

t	o
4	6
+ 2	9
1	5
6	

6 + 9 = 15 How many tens and ones in 15?
Make sure the 1 ten is in the right place.
Now think. I started with 4 tens + 2 tens.
That's 6 tens. Write it in the tens place.
You've just about finished. Write how many in all.

Try these problems.

1.

t	o
3	6
+ 2	9

2.

t	o
4	8
+ 3	4

3.

t	o
3	9
+ 1	4

He had 2 boxes of 10 and 6 more.
She had 3 boxes of 10 and 7 more.
How many did they have in all?

$$\begin{array}{rr} & 2 \text{ tens} & 6 \\ + & 3 \text{ tens} & 7 \\ \hline & 5 \text{ tens} & 13 \end{array}$$

How many tens and ones in 13?
How many tens?
How many in all?

$$\begin{array}{rc|c} & t & o \\ & 2 & 6 \\ + & 3 & 7 \\ \hline & 1 & 3 \\ & 5 & \\ \hline & 6 & 3 \end{array}$$

ADD

1. $\begin{array}{rc|c} & t & o \\ & 2 & 8 \\ + & 1 & 3 \\ \hline \end{array}$

Don't forget!
First add the ones.
Then add the tens.
Write how many in all.

2. $\begin{array}{rc|c} & t & o \\ & 3 & 5 \\ + & 1 & 8 \\ \hline \end{array}$

3. $\begin{array}{rc|c} & t & o \\ & 6 & 4 \\ + & 1 & 9 \\ \hline \end{array}$

4. $\begin{array}{rc|c} & t & o \\ & 4 & 2 \\ + & 2 & 4 \\ \hline \end{array}$

5. $\begin{array}{rc|c} & t & o \\ & 2 & 5 \\ + & 2 & 9 \\ \hline \end{array}$

6. $\begin{array}{rc|c} & t & o \\ & 5 & 3 \\ + & 2 & 9 \\ \hline \end{array}$

7. $\begin{array}{rc|c} & t & o \\ & 3 & 7 \\ + & 4 & 5 \\ \hline \end{array}$

8. $\begin{array}{rc|c} & t & o \\ & 1 & 9 \\ + & 3 & 5 \\ \hline \end{array}$

9. $\begin{array}{rc|c} & t & o \\ & 2 & 7 \\ + & 1 & 8 \\ \hline \end{array}$

10. $\begin{array}{rc|c} & t & o \\ & 5 & 4 \\ + & 3 & 6 \\ \hline \end{array}$

11. $\begin{array}{rc|c} & t & o \\ & 6 & 9 \\ + & 2 & 1 \\ \hline \end{array}$

$$\begin{array}{rr} \text{4 tens} & 6 \\ +\ \text{2 tens} & 5 \\ \hline \text{6 tens} & 11 \end{array} \qquad \begin{array}{r|l} t & o \\ 4 & 6 \\ +\ 2 & 5 \\ \hline 1 & 1 \\ 6 & \\ \hline 7 & 1 \end{array}$$

First add the ones.
Then add the tens.
Write how many in all.

Practise some more addition.

1. $\begin{array}{r|l} t & o \\ 2 & 9 \\ +\ 4 & 2 \\ \hline & \end{array}$ 2. $\begin{array}{r|l} t & o \\ 2 & 6 \\ +\ 3 & 4 \\ \hline & \end{array}$ 3. $\begin{array}{r|l} t & o \\ 4 & 7 \\ +\ 3 & 7 \\ \hline & \end{array}$ 4. $\begin{array}{r|l} t & o \\ 1 & 6 \\ +\ 4 & 6 \\ \hline & \end{array}$

5. $\begin{array}{r|l} t & o \\ 7 & 9 \\ +\ 1 & 8 \\ \hline & \end{array}$ 6. $\begin{array}{r|l} t & o \\ 2 & 4 \\ +\ 3 & 7 \\ \hline & \end{array}$ 7. $\begin{array}{r|l} t & o \\ 4 & 6 \\ +\ 1 & 7 \\ \hline & \end{array}$ 8. $\begin{array}{r|l} t & o \\ 1 & 7 \\ +\ 3 & 9 \\ \hline & \end{array}$

9. $\begin{array}{r|l} t & o \\ 2 & 6 \\ +\ 5 & 5 \\ \hline & \end{array}$ 10. $\begin{array}{r|l} t & o \\ 1 & 3 \\ +\ 2 & 8 \\ \hline & \end{array}$ 11. $\begin{array}{r|l} t & o \\ 6 & 8 \\ +\ 1 & 2 \\ \hline & \end{array}$ 12. $\begin{array}{r|l} t & o \\ 3 & 9 \\ +\ 5 & 2 \\ \hline & \end{array}$

Don't get fooled on these.
Be prepared for
something new.

13. $\begin{array}{r|l} t & o \\ 7 & 4 \\ +\ 2 & 6 \\ \hline & \end{array}$ 14. $\begin{array}{r|l} t & o \\ 6 & 8 \\ +\ 3 & 2 \\ \hline & \end{array}$

15. $\begin{array}{r|l} t & o \\ 4 & 5 \\ +\ 4 & 5 \\ \hline & \end{array}$ 16. $\begin{array}{r|l} t & o \\ 5 & 9 \\ +\ 4 & 1 \\ \hline & \end{array}$

What Happens in Subtraction?

How many ten-trays?

Subtract 1 ten-tray.
But no more. How many remain?

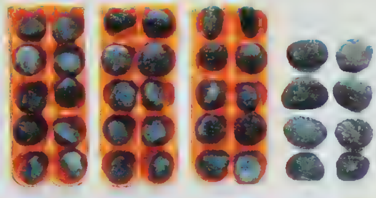
		t | o
What we had to start with →	3 tens 0 ones →	3 | 0
What was taken away →	− 1 ten 0 ones →	− 1 | 0
How many remain? →	2 tens 0 ones →	2 | 0

Subtract.

	a	b	c	d	e	f
1.	$50 - 20$	$40 - 10$	$40 - 20$	$70 - 50$	$20 - 10$	$90 - 10$
2.	$30 - 20$	$80 - 70$	$60 - 30$	$50 - 40$	$40 - 30$	$70 - 30$
3.	$70 - 40$	$90 - 50$	$40 - 40$	$80 - 30$	$60 - 40$	$50 - 30$
4.	$90 - 20$	$80 - 60$	$70 - 10$	$80 - 50$	$90 - 60$	$60 - 40$

Think Subtraction

How many ten-trays?
How many loose ones?



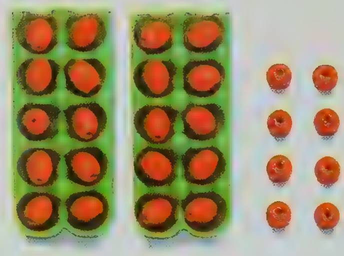
Take 2 ten-trays away. But no loose ones.
How many loose ones now?
How many ten-trays now?
In all, how many remain?

What we had to start with →	3 tens 8 →	38
What was taken away →	− 2 tens 0 →	− 20
How many remain? →	1 ten 8 →	18

Subtract.

	a	b	c	d	e	f
1.	45 − 10	39 − 20	71 − 40	56 − 30	98 − 10	63 − 30
2.	56 − 20	43 − 10	62 − 50	94 − 70	47 − 30	89 − 60
3.	38 − 10	67 − 50	75 − 10	41 − 20	62 − 20	51 − 30
4.	82 − 70	61 − 40	93 − 30	75 − 60	91 − 50	79 − 50

Keep thinking subtraction.
How many ten-trays?
How many loose ones?



Take away 1 ten-tray *and* 5 loose ones.
How many ones now?
How many tens now?
In all, how many remain?

What we had to start with	→		2 tens 8	→		2 | 8
What was taken away	→	−	1 ten 5	→	−	1 | 5
How many remain?	→		1 ten 3	→		1 | 3

Subtract.

	a	b	c	d	e	f	g
1.	39 − 17	59 − 14	28 − 11	37 − 22	37 − 13	25 − 14	36 − 15
2.	47 − 26	59 − 38	93 − 20	45 − 15	58 − 22	39 − 23	64 − 41
3.	89 − 40	37 − 16	23 − 13	49 − 37	52 − 40	96 − 41	76 − 34

Bill went to the cookie jar.
He wanted to take 3 cookies.
There were no cookies there.
Could he take 3 cookies from the jar?

There was 1 package of 10 thumbtacks.
There were no loose ones anywhere.
Marie needs 3 tacks.
What could she do to get 3?

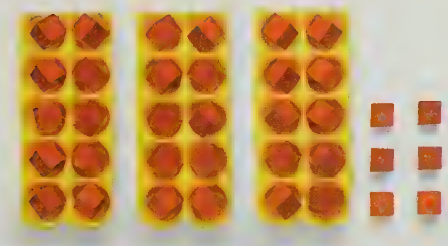
There was 1 package of 10 pencils.
There were 2 more pencils beside the package.
8 people needed 1 pencil each.
How could they get the 8 pencils?

The same sort of thing can happen when we subtract numbers.

	tens	ones	
	3	6	to start with
−		9	to be taken away
		NO	

Use ten-trays to help you think this one through.

How can you take 9 away?



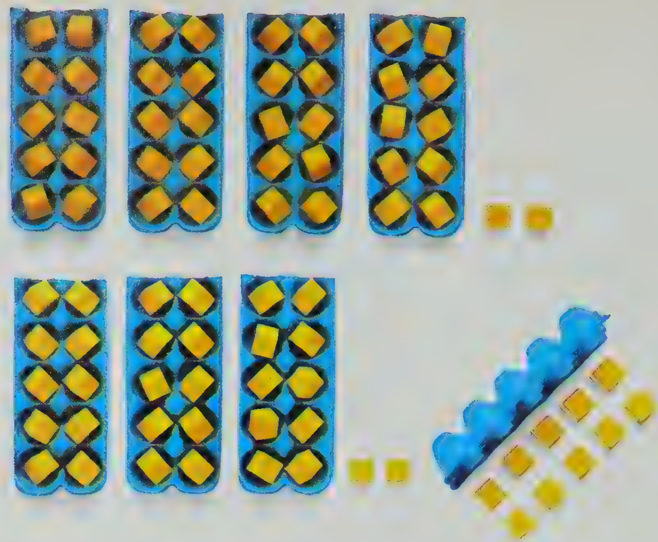
Can you dump one ten-tray?

Now you have 16 loose ones.
Can you take 9 away?
How many remain?

TRY ANOTHER PROBLEM

Your job is to take 8 away.

Look at the numbers after you dump one ten-tray.



$$\begin{array}{rrl} & 3\ 12 & \text{another name for 42} \\ & \cancel{4}\ \cancel{2} & \text{to start with} \\ - & 8 & \text{to take away} \\ \hline & 3\ 4 & \text{remain} \end{array}$$

It's a good thing we can rename numbers. There would be real trouble with subtraction if we couldn't.

This is what you might think as you get ready to subtract.

$$\begin{array}{rrl} & 5\ 3 & \text{to start with} \\ - & 7 & \text{to take away} \\ \hline & \text{NO} & \text{You need to rename 53.} \end{array}$$

$$\begin{array}{rrl} & 4\ 13 & \\ & \cancel{5}\ \cancel{3} & \\ - & 7 & \\ \hline & ■\ ■ & \text{Now you can subtract!} \end{array}$$

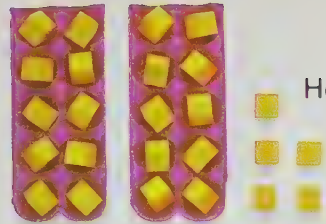
Time for practice. You will have to rename tens and ones each time.

1.
$$\begin{array}{rrl} & 4\ 5 & \leftarrow \text{First rename.} \\ - & 6 & \leftarrow \text{Then subtract.} \\ \hline & ■\ ■ & \leftarrow \text{How many ones remain?} \\ & & \text{How many tens remain?} \end{array}$$

2.
$$\begin{array}{rr} & 3\ 2 \\ - & 6 \\ \hline \end{array}$$

3.
$$\begin{array}{rr} & 6\ 4 \\ - & 7 \\ \hline \end{array}$$

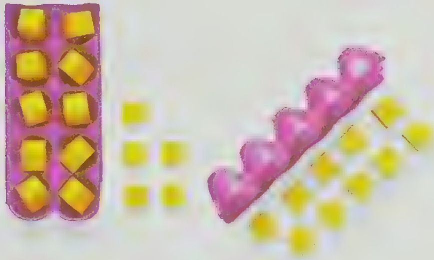
You'll get good at this in no time at all.



How many in all?
Take away 8.

$$\begin{array}{r} 2\,5 \\ -\ \ 8 \\ \hline \end{array}$$

NO



How many in all?
Take away 8.

$$\begin{array}{r} {\scriptstyle 1}\ \ {\scriptstyle 15} \\ \cancel{2}\ \cancel{5} \\ -\ \ \ 8 \\ \hline \square\ \square \end{array}$$

First rename.
Then subtract.
ones remain
tens remain

Rename and subtract.

	a	b	c	d	e	f	g
1.	54 − 6	26 − 8	36 − 7	41 − 6	64 − 7	63 − 9	64 − 5
2.	35 − 8	32 − 4	71 − 5	47 − 9	30 − 1	51 − 2	62 − 3
3.	40 − 9	73 − 4	22 − 8	50 − 2	46 − 9	23 − 4	28 − 9

What is different in this problem?
Do you think it will cause trouble?
Try it. First we must rename.

$$\begin{array}{r|l} \text{t} & \text{o} \\ 4 & 5 \\ -\,2 & 6 \\ \hline \end{array}$$

$$\begin{array}{r|l} \text{t} & \text{o} \\ 3 & 15 \\ \cancel{4} & \cancel{5} \\ -\,2 & 6 \\ \hline \end{array}$$

No trouble in renaming. Same old stuff.

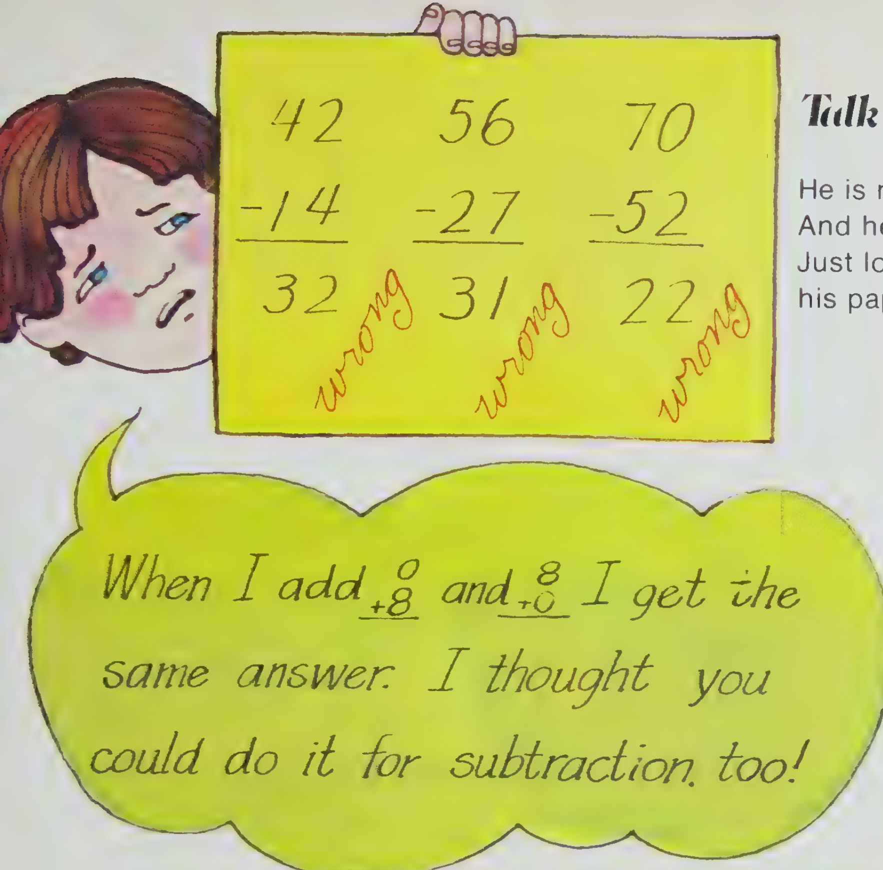
Now you can subtract.

How many ones remain? 15 ones − 6 ones = 9 ones

How many tens remain? 3 tens − 2 tens = 1 ten

You see, there is no trouble at all. Take time for practice. Each problem needs renaming.

	a	b	c	d	e	f
1.	60 − 13	84 − 36	90 − 18	94 − 67	82 − 29	92 − 46
2.	93 − 28	90 − 77	71 − 19	51 − 27	42 − 38	71 − 28
3.	80 − 42	44 − 39	73 − 65	90 − 86	83 − 78	52 − 45



Talk about this page.

He is not happy.
And here is why.
Just look at
his paper.

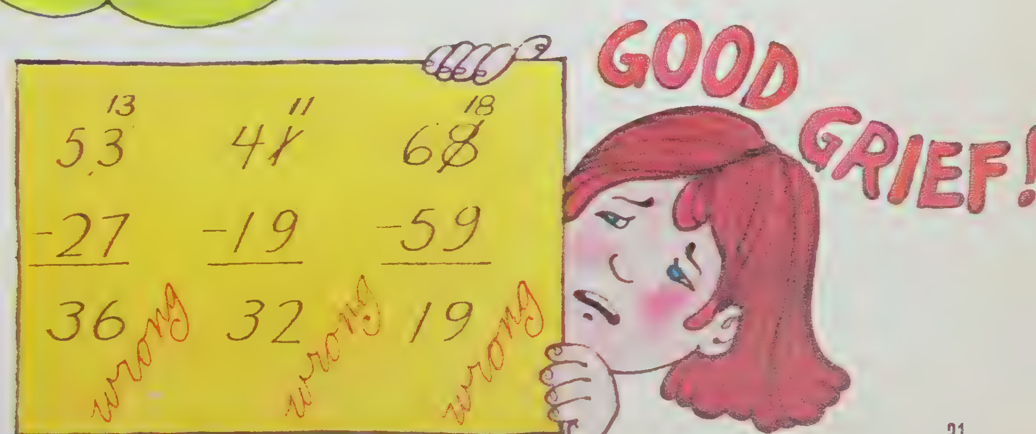
What did he do wrong?

He really thought it was O.K. to change the order of the two numbers.

He forgot the story about the cookie jar. If there aren't any cookies, you can't take any cookies.

She is not happy either.
Look at her paper.

What did she do wrong?



8 people were each supposed to sell at least 45 tickets for the raffle. Find out how many tickets each person had yet to sell.

		Number of tickets to be sold	Number of tickets sold	Number yet to sell
1.	Herb	45	26	?
2.	Sue	45	35	?
3.	Bob	45	24	?
4.	Kay	45	40	?
5.	John	45	37	?
6.	Linda	45	31	?
7.	Roy	45	28	?
8.	Helen	45	29	?

Both John and Helen say that you made a mistake. The numbers you have for them are wrong. Are they? How can you prove that you are right?

Look at a simple problem.

Does $8 - 5 = 3$?
Check by asking, "Does $3 + 5 = 8$?"
Does it? Is the subtraction then correct?

Adding the number that was taken away is a good way to check.

John

$$\begin{array}{r|l} 4 & 5 \\ -\ 3 & 7 \\ \hline ? & ? \end{array} \xrightarrow{\text{your answer}} \begin{array}{r|l} & 8 \\ ? & ? \\ +\ 3 & 7 \\ \hline 4 & 5 \end{array}$$

Helen

$$\begin{array}{r|l} 4 & 5 \\ -\ 2 & 9 \\ \hline ? & ? \end{array} \xrightarrow{\text{your answer}} \begin{array}{r|l} 1 & 6 \\ ? & ? \\ +\ 2 & 9 \\ \hline 4 & 5 \end{array}$$

Did you make an error on the number of tickets yet to be sold?

WATCH OUT!

GIRLS

do this set. Look at the signs.

	a	b	c
1.	$\begin{array}{r} 44 \\ -\ 19 \\ \hline \end{array}$	$\begin{array}{r} 29 \\ +\ 19 \\ \hline \end{array}$	$\begin{array}{r} 47 \\ -\ 18 \\ \hline \end{array}$
2.	$\begin{array}{r} 53 \\ +\ 17 \\ \hline \end{array}$	$\begin{array}{r} 31 \\ -\ 18 \\ \hline \end{array}$	$\begin{array}{r} 41 \\ -\ 29 \\ \hline \end{array}$
3.	$\begin{array}{r} 17 \\ +\ 39 \\ \hline \end{array}$	$\begin{array}{r} 36 \\ +\ 47 \\ \hline \end{array}$	$\begin{array}{r} 60 \\ -\ 24 \\ \hline \end{array}$

BOYS

do this set. Look at the signs.

	a	b	c
1.	$\begin{array}{r} 57 \\ -\ 18 \\ \hline \end{array}$	$\begin{array}{r} 39 \\ +\ 17 \\ \hline \end{array}$	$\begin{array}{r} 54 \\ -\ 19 \\ \hline \end{array}$
2.	$\begin{array}{r} 41 \\ -\ 18 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ +\ 53 \\ \hline \end{array}$	$\begin{array}{r} 41 \\ -\ 29 \\ \hline \end{array}$
3.	$\begin{array}{r} 39 \\ +\ 19 \\ \hline \end{array}$	$\begin{array}{r} 47 \\ +\ 36 \\ \hline \end{array}$	$\begin{array}{r} 50 \\ -\ 27 \\ \hline \end{array}$

Look at the two sets of problems. Who do you think had the easier problems to do?

THEY HELPED WITH THE SALE.

1. 57 letters done.
28 letters yet to do.
How many letters in all?

2. They had 56 stamps.
They bought 19 more.
How many stamps in all?

3. They mailed 49 letters.
They mailed 26 more.
How many mailed in all?

4. 43 big books for sale.
17 big books sold.
How many remain?

5. 64 little books for sale.
35 little books sold.
How many remain?

6. 76 comic books for sale.
49 comic books sold.
How many remain?

7. Burt sold 17 games.
Betty sold 24 games.
How many sold in all?

8. Barb sold 16 puzzles.
Bob sold 14 puzzles.
How many sold in all?

9. Ben sold 25 toys.
Babs sold 36 toys.
How many sold in all?

10. Dee sold 35 cookies.
Debbie sold 23 more.
And Donna sold 39.
How many sold in all?

11. Pat sold 12 cakes.
Paul sold 15 more.
And Peter sold 14.
How many sold in all?

The Smiths ate breakfast, and then they were off for their family reunion.

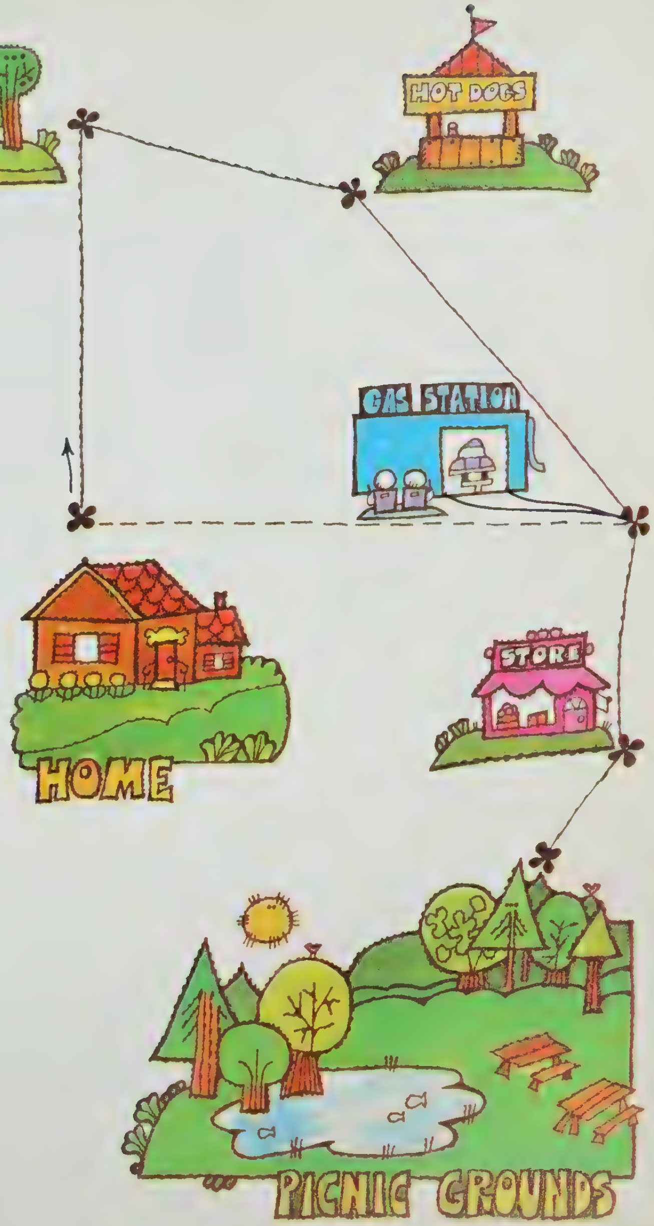
1. Bobby saw a hotdog stand. He said he was starving. He had 27 cents in one pocket and 18 cents in another pocket. How much did he have in all? They didn't stop, anyway.

2. The car had a flat tire. It took 16 minutes to find the car jack, raise the car, and remove the wheel. It took nine minutes to put the spare tire on the car and put the flat in the trunk. How long did it take in all?

3. They stopped at a store near the picnic grounds. Mom bought 16 cans of cold pop. Dad didn't notice this and he bought 16 cans of cold pop too. How many cans of cold pop did they buy in all?

4. They finally got to the picnic. What a crowd! There were 27 Smiths, 18 Simpsons, 30 Stinsons, 16 Stiltons, 16 Gilligans, 16 Milligans, and 9 Smythes. How many people were there in all?

5. How many people at the picnic had a name beginning with the letter "S"?



CHECKOUT

You go to the store and pick out the things you need.
In some stores you take the things to a checkout counter.
You pay for the things. Then they are your very own.

You have picked out some new skills in the math store.
This page will be your checkout.
It will help you decide which skills are your very own.
And it will help you decide which skills need more practice.
You'll have time for more practice. So don't worry.

Add these.

1. $\begin{array}{r|l} \text{t} & \text{o} \\ 3 & 4 \\ +\ 6 & 0 \\ \hline \end{array}$

2. $\begin{array}{r|l} \text{t} & \text{o} \\ 4 & 1 \\ +\ 2 & 5 \\ \hline \end{array}$

3. $\begin{array}{r|l} \text{t} & \text{o} \\ 7 & 5 \\ + & 6 \\ \hline \end{array}$

4. $\begin{array}{r|l} \text{t} & \text{o} \\ 1 & 5 \\ +\ 2 & 5 \\ \hline \end{array}$

5. $\begin{array}{r|l} \text{t} & \text{o} \\ 2 & 7 \\ +\ 7 & 5 \\ \hline \end{array}$

Subtract these.

6. $\begin{array}{r|l} \text{t} & \text{o} \\ 8 & 4 \\ -\ 6 & 0 \\ \hline \end{array}$

7. $\begin{array}{r|l} \text{t} & \text{o} \\ 6 & 7 \\ -\ 4 & 1 \\ \hline \end{array}$

8. $\begin{array}{r|l} \text{t} & \text{o} \\ 9 & 3 \\ -\ 2 & 6 \\ \hline \end{array}$

9. $\begin{array}{r|l} \text{t} & \text{o} \\ 6 & 0 \\ -\ 2 & 5 \\ \hline \end{array}$

10. $\begin{array}{r|l} \text{t} & \text{o} \\ 7 & 2 \\ -\ 5 & 9 \\ \hline \end{array}$

Watch out for these! Look at the signs.

11. $\begin{array}{r|l} \text{t} & \text{o} \\ 8 & 0 \\ -\ 1 & 1 \\ \hline \end{array}$

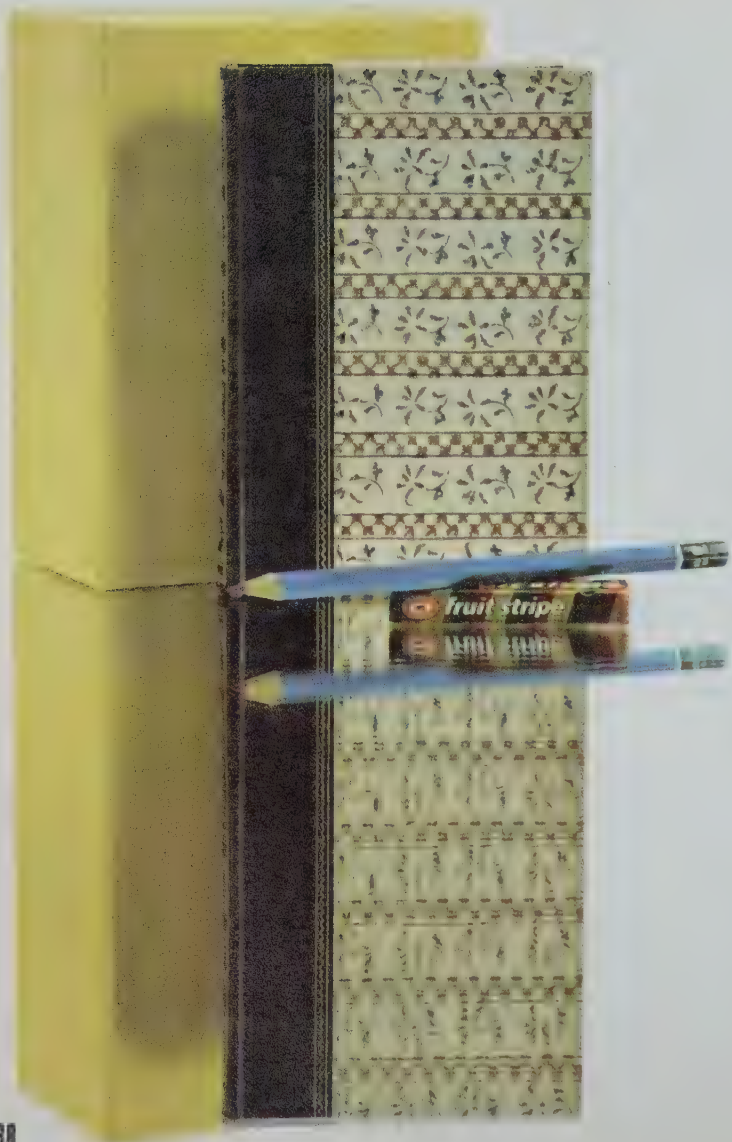
12. $\begin{array}{r|l} \text{t} & \text{o} \\ 7 & 6 \\ -\ 2 & 0 \\ \hline \end{array}$

13. $\begin{array}{r|l} \text{t} & \text{o} \\ 2 & 3 \\ +\ 4 & 9 \\ \hline \end{array}$

14. $\begin{array}{r|l} \text{t} & \text{o} \\ 8 & 1 \\ -\ 5 & 1 \\ \hline \end{array}$

15. $\begin{array}{r|l} \text{t} & \text{o} \\ 9 & 0 \\ -\ 7 & 4 \\ \hline \end{array}$

2 MULTIPLICATION



HOW MANY?

1. Lil bought 5 pencils.
   Each pencil cost 5¢.
   How many cents did she spend?
   $5 + 5 + 5 + 5 + 5 = \underline{?}$

2. Jim bought 4 packages of gum.
   Each package cost 8¢.
   How many cents did he spend?
   $8 + 8 + 8 + 8 = \underline{?}$

3. Dan needed 6 books.
   Each book cost 3¢.
   How many cents did he spend?
   $3 + 3 + 3 + 3 + 3 + 3 = \underline{?}$

4. Liz carried 4 boxes.
   Each box contained 6 muffins.
   How many muffins did she carry?
   $6 + 6 + 6 + 6 = ?$

5 + 5 + 5 + 5

5. Paul delivered a newspaper to every house. He covered 4 blocks. There were 5 houses in each block. How many papers did he deliver?

Think about answers for these.

6. Can you figure out a faster way to tell how many?

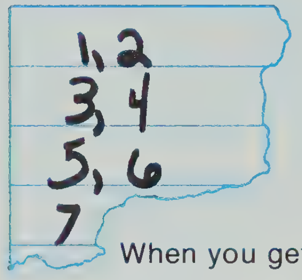
7. Can you count by 2s? by 3s? by 4s? by 5s?

8. Can you answer these questions?
   - **a** 5 times 3 is how many?
   - **b** 4 times 6 is how many?

   You'll be able to answer them soon.

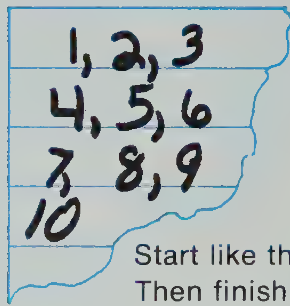
You have a
GOAL
Learn how to multiply

1. You will need 9 lines on your paper.
Write the numerals in order from 1 to 18.
Put only two on each line.



When you get to here,
you are on your own.

2. Start over. You will need 9 lines again.
Write the numerals in order from 1 to 27.
Put only three on each line.



Start like this.
Then finish the job.

GUESS WHAT?

Your job goes on.

3. Write 1 to 36. This time put four numerals on each line.

4. 1 to 45. This time put five numerals on each line.

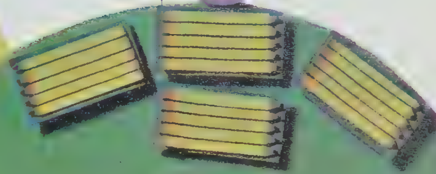
5. Pretend you have to skip-count by 2s to 18. Would one of your lists help you?

6. Would the lists help you skip-count by 3s? or by 4s? or by 5s?

7. Make a list that would help you skip-count by 6s.

How many hands?
How many fingers on each?
How many fingers in all?

How many flowers?
How many petals on each?
How many petals in all?



How many packages?
How many pencils in each?
How many pencils in all?

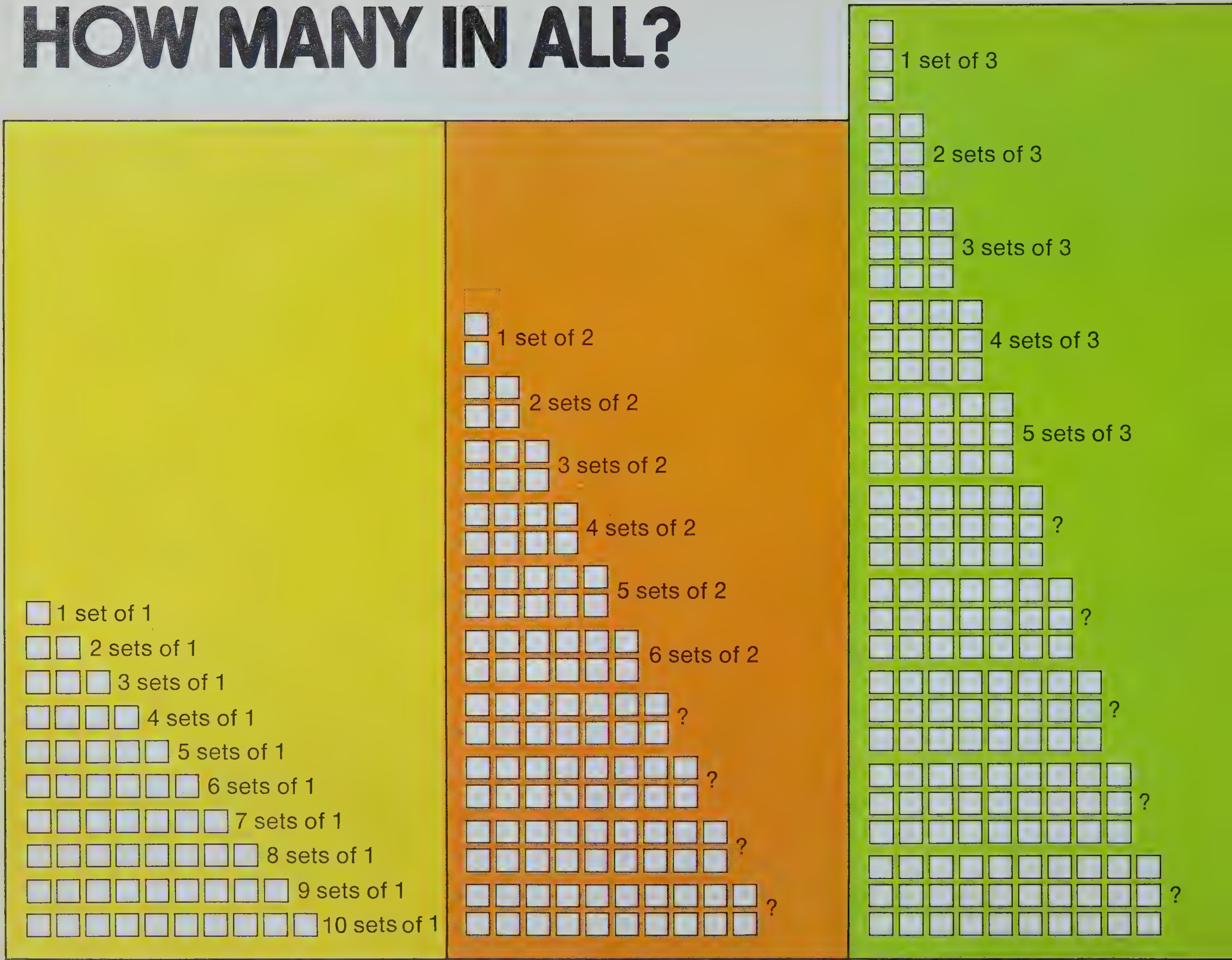
How many squares?
How many corners on each?
How many corners in all?

How many plants?
How many leaves on each?
How many leaves in all?

How many stars?
How many points on each?
How many points in all?

How many glasses?
How many lenses in each?
How many lenses in all?

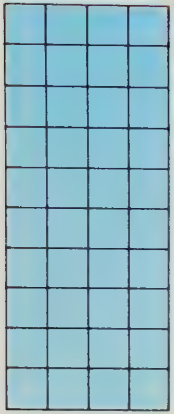
HOW MANY IN ALL?



Complete

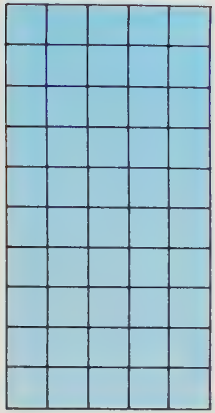
Tell how many squares in all.

1.



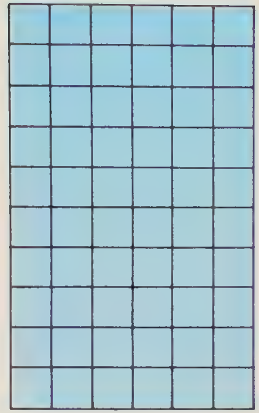
4
8
12
16
a
b
c
d
e
f

2.



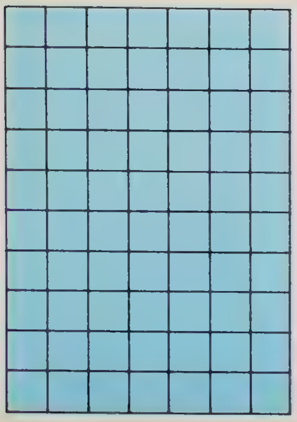
5
10
15
20
a
b
c
d
e
f

3.



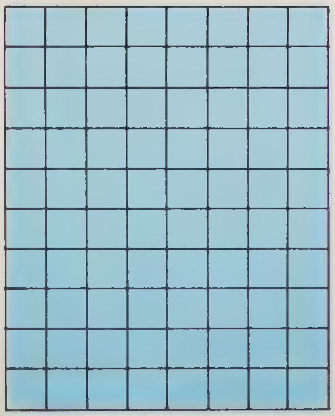
6
a
b
c
d
36
42
48
54
60

4.



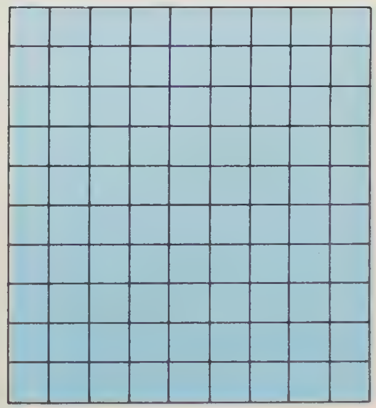
7
a
b
c
d
42
49
56
63
70

5.



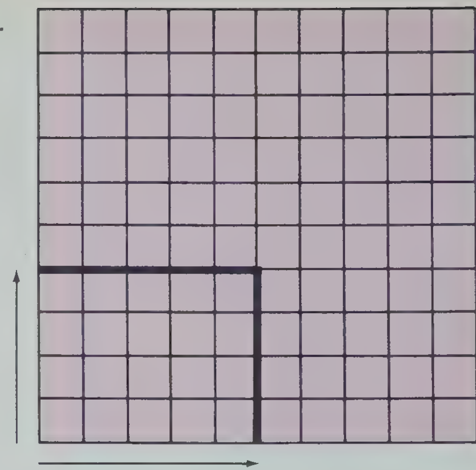
8
a
b
c
d
48
56
64
72
80

6.



9
a
b
c
d
54
63
72
81
90

The pictures that you used are O.K.
But they take a long time to draw.
Let's see if there isn't a better way.

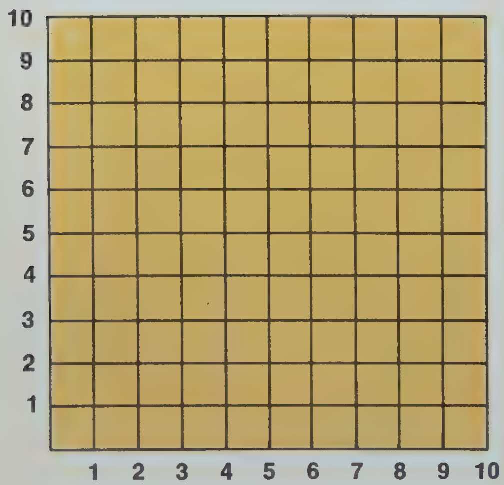


Look at the grid.
How many squares in each row?
How many rows?

Use only part of the grid.

Count up 4.
Count across 5.
How many squares in all?

This idea will work too!
One grid can help with
all numbers up to 10.



Maybe if we label the grid, it will save you time.

1. Count up 3. Count across 4.
   3 fours are how many?

2. Count up 6. Count across 3.
   6 threes are how many?

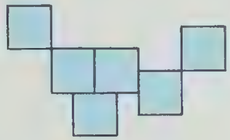
3. Count up 4. Count across 2.
   4 twos are how many?

4. Count up 2. Count across 9.
   2 nines are how many?

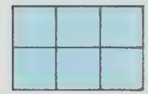
You have heard someone say, "I have to get *organized*".
What does that mean?

Organizing objects into a pattern can help us tell how many.

Are these blocks organized?
How many blocks?



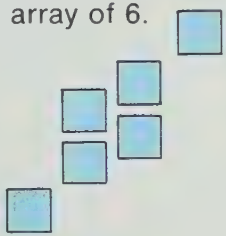
Are these organized?
How many blocks?



Some patterns form an array.

This pattern is
an array of 6.

This pattern is not
an array of 6.



How are these patterns different?

This pattern is
an array.

This pattern is not
an array.

How are these patterns different?

Make some arrays.

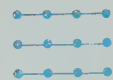
1. Show 5 sets of 4 dots.
   Write how many dots in all.
2. Show 4 sets of 5 squares.
   Write how many squares in all.
3. Show 3 sets of 2 triangles.
   Write how many triangles in all.
4. Show 2 sets of 3 dots.
   Write how many dots in all.
5. Show 5 sets of 1 square.
   Write how many squares in all.
6. Show 3 sets of 3 triangles.
   Write how many triangles in all.

HERE ARE SOME MORE ARRAYS

1. 

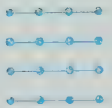
$\underbrace{4 + 4}_{\text{2 sets of 4}}$

How many in all?

2. 

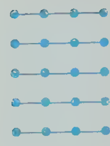
$\underbrace{4 + 4 + 4}_{\text{3 sets of 4}}$

How many in all?

3. 

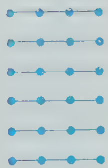
$\underbrace{4 + 4 + 4 + 4}_{\text{4 sets of 4}}$

How many in all?

4. 

$\underbrace{4 + 4 + 4 + 4 + 4}_{\text{5 sets of 4}}$

How many in all?

5. 

$\underbrace{4 + 4 + 4 + 4 + 4 + 4}_{\text{6 sets of 4}}$

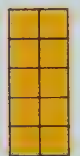
How many in all?

6. Could an array show 7 sets of 4?

7. Could an array show 8 sets of 4?

8. Could 9 sets of 4 be shown?

9. 5 is used how many times?



2 times 5 is how many?

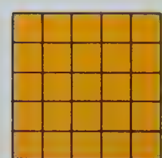
10. 5 is used how many times?

3 times 5 is how many?

11. 5 is used how many times?

4 times 5 is how many?

12. 5 is used how many times?



5 times 5 is how many?

A TRAFFIC SIGN SIGNALS US

MATHEMATICS SYMBOLS SIGNAL US

$6 + 3$

$+$ signals addition.

$7 - 4$

$-$ signals subtraction.

$2 + 4 = 6$

$=$ signals equals.

3×5

$\times$ signals multiplication.

Tells how many in each set.
It is also called a factor.

Tells how many sets.
It is called a factor.

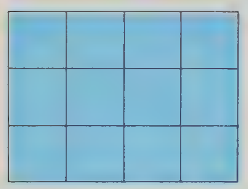
Tells how many in all.
This is a product.

$$6 \times 3 = 18$$

Symbol for *times*.
It signals multiplication.

Symbol for *equals*.
What's on the left is as much as what's on the right.

We could add to find how many. But try multiplication.



4 is used how many times?

3 times 4 is how many?

Use symbols to replace words.

We say 3 times 4 is 12

We can write $3 \times 4 = 12$

We say 2 times 3 is 6.
We write $2 \times 3 = 6$.

We say 3 times 2 is 6.
We write $3 \times 2 = 6$.

Draw an array or use a grid to help you answer these.
Find the products.

1. $1 \times 2 = ?$	**2.** $1 \times 3 = ?$	**3.** $1 \times 4 = ?$	**4.** $1 \times 5 = ?$
$2 \times 2 = ?$	$2 \times 3 = ?$	$2 \times 4 = ?$	$2 \times 5 = ?$
$3 \times 2 = ?$	$3 \times 3 = ?$	$3 \times 4 = ?$	$3 \times 5 = ?$
$4 \times 2 = ?$	$4 \times 3 = ?$	$4 \times 4 = ?$	$4 \times 5 = ?$
$5 \times 2 = ?$	$5 \times 3 = ?$	$5 \times 4 = ?$	$5 \times 5 = ?$
$6 \times 2 = ?$	$6 \times 3 = ?$	$6 \times 4 = ?$	$6 \times 5 = ?$
$7 \times 2 = ?$	$7 \times 3 = ?$	$7 \times 4 = ?$	$7 \times 5 = ?$
$8 \times 2 = ?$	$8 \times 3 = ?$	$8 \times 4 = ?$	$8 \times 5 = ?$
$9 \times 2 = ?$	$9 \times 3 = ?$	$9 \times 4 = ?$	$9 \times 5 = ?$

1. Use multiplication to solve some word problems.

a She has 2 pockets.
She has 3¢ in each pocket.
How many pennies in all?
$2 \times 3 = \underline{?}$

b He has 2 bowls.
He has 2 fish in each bowl.
How many fish in all?
$2 \times 2 = \underline{?}$

c They buy 6 bars.
Each candy bar costs 5¢.
How many cents did they pay?
$6 \times 5 = \underline{?}$

d There are 4 cars.
There are 6 people in each car.
How many people in all?
$4 \times 6 = \underline{?}$

Before you can solve problems quickly,
you need to know multiplication facts.
How many facts do you know now? Find out.

	a	**b**	**c**	**d**
2.	$2 \times 4 = ?$	$5 \times 3 = ?$	$4 \times 5 = ?$	$3 \times 2 = ?$
3.	$3 \times 5 = ?$	$4 \times 4 = ?$	$2 \times 2 = ?$	$4 \times 3 = ?$
4.	$2 \times 3 = ?$	$5 \times 4 = ?$	$2 \times 5 = ?$	$3 \times 3 = ?$
5.	$4 \times 2 = ?$	$3 \times 4 = ?$	$3 \times 1 = ?$	$5 \times 5 = ?$

You may want to use your grid or draw an array for these.

	a	**b**	**c**	**d**
6.	$3 \times 7 = ?$	$5 \times 8 = ?$	$2 \times 6 = ?$	$4 \times 7 = ?$
7.	$5 \times 6 = ?$	$4 \times 8 = ?$	$3 \times 8 = ?$	$2 \times 9 = ?$
8.	$4 \times 9 = ?$	$2 \times 7 = ?$	$5 \times 9 = ?$	$4 \times 6 = ?$
9.	$3 \times 9 = ?$	$2 \times 9 = ?$	$3 \times 6 = ?$	$5 \times 7 = ?$

Find the answer.

1. Peter is to mow the grass.
He gets 2 dollars every time.
Peter is lazy.
He mowed the grass 0 times.
How many dollars did he get paid?

2. Roger has to mow the grass too.
His dad won't let him be lazy.
Roger mows the grass for free.
He mowed the grass 5 times.
How many dollars did Roger get paid?

3. Draw a picture to show – 0 beads used 3 times
0 beads used 0 times.

It's easy to multiply zero.
Any number times zero equals zero.
And zero times any number equals zero.

Find the answer.

4. $1 \times 0 = ?$
$2 \times 0 = ?$
$3 \times 0 = ?$
$4 \times 0 = ?$
$5 \times 0 = ?$
$6 \times 0 = ?$
$7 \times 0 = ?$
$8 \times 0 = ?$
$9 \times 0 = ?$

5. $1 \times 1 = ?$
$2 \times 1 = ?$
$3 \times 1 = ?$
$4 \times 1 = ?$
$5 \times 1 = ?$
$6 \times 1 = ?$
$7 \times 1 = ?$
$8 \times 1 = ?$
$9 \times 1 = ?$

LOOK OUT

6. $8 \times 1 = ?$
$1 \times 8 = ?$
$0 \times 5 = ?$
$1 \times 1 = ?$
$1 \times 9 = ?$
$9 \times 0 = ?$
$0 \times 6 = ?$
$1 \times 7 = ?$
$0 \times 0 = ?$

CHECKOUT

We have just started our study of multiplication. You will see more about this operation on numbers. Multiplication helps solve a lot of problems like these. Can you solve them now?

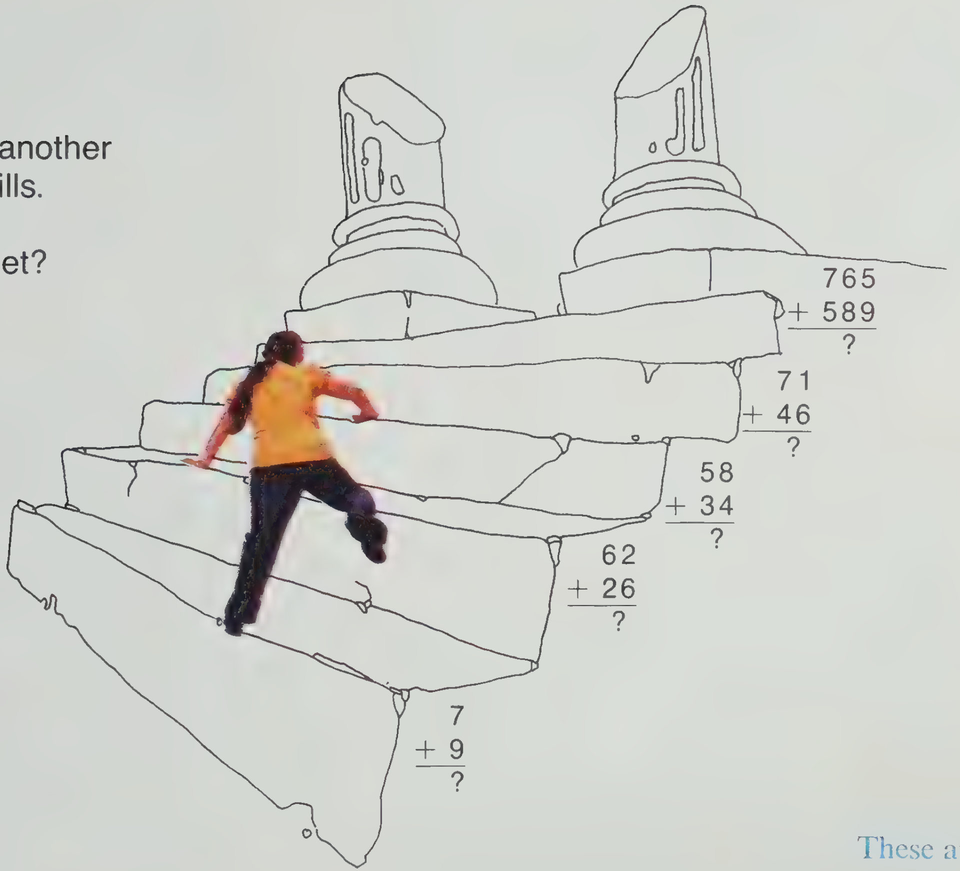
How much money do you need to buy—

1. 3 globs of bubble gum that cost 5¢ each?
2. 5 pencils that cost 8¢ each?
3. 6 lollipops that cost 4¢ each?
4. 7 used comic books that cost 5¢ each?
5. 3 stamps that cost 8¢ each?
6. 4 apples that cost 7¢ each?
7. 5 mystery packages that cost 9¢ each?

3 ADDITION

Get ready to take another
step in addition skills.

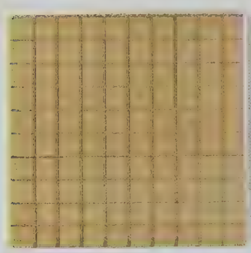
How far can you get?



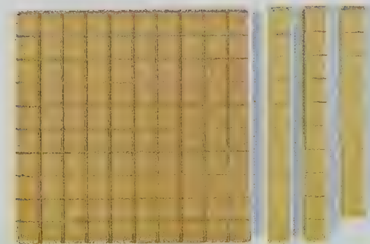
These are *BIG* steps.

But you will get to the top!

Let that be YOUR GOAL

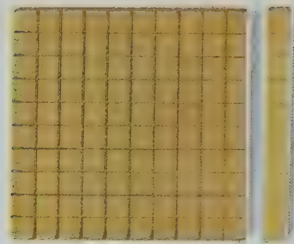


1. This is an array of 100.
   - a How many sets of 10 in this array?
   - b How many sets of 1 in this array?



3. How many are shown here?
   - a How many sets of 100 in the whole thing?
   - b How many sets of 10 in the whole thing?
   - c How many sets of 1 in the whole thing?
     The number 129 can have many names.

   But don't forget,
   129 means 1 hundred + 2 tens + 9 ones.



2. This picture shows 110 squares.
   - a How many sets of 100 in the whole thing?
   - b How many sets of 10 in the whole thing?
   - c How many sets of 1 in the whole thing?
     The number 110 can have many names.

   But don't forget,
   110 means 1 hundred + 1 ten + 0 ones.

4. Write the numeral for each.
   - a 3 hundreds + 2 tens + 8 ones
   - b 4 hundreds + 9 tens + 0 ones
   - c 9 hundreds + 5 tens + 7 ones
   - d 5 hundreds + 0 tens + 6 ones
   - e 2 hundreds + 2 tens + 2 ones
   - f 7 hundreds + 7 tens + 7 ones
   - g 0 hundreds + 1 ten + 0 ones
   - h 0 hundreds + 0 tens + 4 ones
   - i 8 hundreds + 0 tens + 0 ones

Pretend you have a job telling how many boxes of buttons can be packed. The buttons come to you in buckets. This bucket of 262 buttons has to be packed in boxes. The number in your bucket goes in the total column.

How many boxes of 100?
How many boxes of 10?
How many buttons left over?

Here come the buckets of buttons. Make a chart like this one. Complete it.

Total	Boxes of 100	Boxes of 10	Ones left over
262	2	6	2
511	?	?	?
27	?	?	?
399	?	?	?
407	?	?	?
100	?	?	?
450	?	?	?
999	?	?	?
1000	?	?	?

Your boss tells you to stop telling how many boxes of 100. Now your job is to make another chart and tell how many boxes of 10 can be packed. You still may have some left over.

Total	Boxes of 10	Ones left over
262	?	?
511	?	?
27	?	?
399	?	?
407	?	?
100	?	?
450	?	?
999	?	?
1000	?	?

1. This bag of goodies goes to the person who asks for the most.

   a I say I want all the sets of 100 I can get. How many sets of hundreds can I have?

   b He wants all the sets of 10 he can get. How many sets of tens can he have?

   c You want all the sets of 1 you can get. How many can you have?

   d Who gets the bag?

2. Let's change the rules. Now you take out the number you ask for when you ask for it. O.K.?

   a You ask for the hundreds. How many do you get?

   b She asks for the tens. How many does she get?

   c I ask for the ones remaining. How many do I get?

   d Who got the most this time?

3. All whole numbers can be written with these symbols: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. These symbols are called digits. Look at how the value of a digit can change.

9	This 9 means 9 ones.
90	Here it means 9 tens.
900	Here it means 9 hundreds.
9000	Now it means 9 thousands.

   a Use the digits 6 and 0 to write six hundred.

   b Use the digits 2 and 0 to write two thousand.

The numbers we use are neat. You can always depend upon their value.
They always have a special place saved for each digit.

1. We look at the number 524 and we know what it means.

		hundreds	tens	ones	
a	524	5	2	4	But can it be renamed?
b	607	6	0	7	What could be another name?
c	197	1	9	7	What could be another name?
d	24	0	2	4	Does this have another name?
e	970	9	7	0	Another name, please.
f	500	5	0	0	Another name, please.
g	1	0	0	1	Another name???

2. It's your turn now. Tell how many hundreds, how many tens, and how many ones.

a 461 **b** 102 **c** 350

d 59 **e** 875 **f** 526

g 70 **h** 9 **i** 200

j Look back. Which number has the greatest number of hundreds?
Is that the largest number?

3. Write how many tens and ones.

a 4 hundreds 2 tens 6 ones

b 9 hundreds 8 tens 0 ones

c 2 hundreds 0 tens 9 ones

d 5 hundreds 0 tens 0 ones

e 0 hundreds 9 tens 3 ones

f 0 hundreds 5 tens 0 ones

g 0 hundreds 1 ten 1 one

h 1 hundred 0 tens 0 ones

Talk about this.

1000

There was an argument.

 says there is no such number. Is she right?

 says there are 10 hundreds, 0 tens, 0 ones.

 says there are 100 tens and 0 ones. Who's right?

 says there is another way to name it.
1 thousand, 0 hundreds, 0 tens, 0 ones.
That's what 1 thousand means.
Can he be right?

Your turn

1. How many ones make 1 thousand?

2. How many tens make 1 thousand?

3. How many hundreds make 1 thousand?

4. Practise. Make a chart like this and complete it.

		thousands	hundreds	tens	ones
a	2000	?	?	?	?
b	4678	?	?	?	?
c	6701	?	?	?	?
d	1050	?	?	?	?
e	3005	?	?	?	?

Do you think you will ever add numbers as large as these?

1. Write the greatest number of each pair.

a 1 or 10	b 10 or 100	c 100 or 1000
d 9 or 90	e 90 or 900	f 900 or 9000
g 423 or 324	h 509 or 905	i 601 or 610

2. Remember the symbol >? What does it stand for?
What does the symbol < mean?

3. Copy. Write > or < to show how the numbers relate to each other.

a 567 ? 725	b 150 ? 105	c 520 ? 502
b 26 ? 62	e 90 ? 100	f 376 ? 276
g 1000 ? 2000	h 3000 ? 2999	i 6000 ? 5000

*4. Let's pretend you want to buy a lot of things. You don't have much money. You decide to look in several stores to see where you can get the most for your money.

YOU WANT	STORE 1	STORE 2	STORE 3
tape for a recorder	69¢	89¢	94¢
a game to give as a present	75¢	73¢	79¢
bike wrench	39¢	40¢	35¢
comic book	25¢	28¢	29¢
gum	7¢ a pack	10¢ a pack	2 packs for 15¢

You have collected your information.
What is the "best buy"?

If you add ones, is your answer less than 1 ten?

9 + 1	8 + 2	7 + 3	6 + 4	5 + 5	4 + 6	3 + 7	2 + 8	1 + 9

You added ones and got tens.
When you add ones, do you always get tens?
Can your answer be less than 1 ten?
Can it be more than 1 ten?

Find out

	a	b	c	d	e	f	g	h	i
1.	2 + 9	8 + 4	8 + 5	7 + 4	7 + 5	5 + 3	5 + 6	3 + 7	6 + 2
2.	4 + 5	9 + 9	6 + 7	2 + 7	7 + 9	6 + 5	7 + 6	1 + 8	3 + 6

3. Look back. Is any answer more than 2 tens?

If you add tens, can your answer be less than 1 ten?
Can it be exactly 1 ten? Can it be less than 10 tens?
Can it be exactly 10 tens? Can it be more than 10 tens?

Find out

	a	b	c	d	e	f	g
4.	30 + 40	60 + 60	40 + 70	90 + 30	20 + 60	30 + 80	20 + 80
5.	90 + 20	80 + 90	60 + 40	50 + 90	70 + 30	70 + 70	40 + 90

6. Look at your answers. Is any answer more than 10 tens?

Everyone wants to save paper. Why? This page might show you how to save writing space. Will that help save paper? Will it help save time?

Find out

REMEMBER THIS?

tens	ones	
4	7	
+ 3	8	
1	5	Add ones.
7		Add tens.
8	5	How many in all?

Look at another problem.
This one is written two ways.
How are the problems different?

Same numbers?
Same answer?

Where did this come from?

t	o
1	
5	3
+ 2	9
8	2

Add ones.
Add tens.

t	o
5	3
+ 2	9
1	2
7	
8	2

Try saving space on these.

1. 41 + 39

2. 72 + 18

3. 63 + 27

4. 54 + 16

5. 45 + 39

6. 56 + 25

7. 57 + 37

8. 68 + 33

9. 73 + 27

10. 32 + 28

You can use the paper-saving form. Or use the other if you like it best.
Can you do these without any mistakes? Try it.

1. $\begin{array}{r} 2\,5 \\ +\ 5\,8 \\ \hline \end{array}$

Add ones.
Add tens.

2. $\begin{array}{r} 3\,6 \\ +\ 4\,9 \\ \hline \end{array}$

Add ones.
Add tens.

3. $\begin{array}{r} 4\,7 \\ +\ 2\,3 \\ \hline \end{array}$
4. $\begin{array}{r} 6\,9 \\ +\ 1\,7 \\ \hline \end{array}$
5. $\begin{array}{r} 2\,8 \\ +\ 3\,9 \\ \hline \end{array}$
6. $\begin{array}{r} 4\,5 \\ +\ 2\,6 \\ \hline \end{array}$
7. $\begin{array}{r} 7\,8 \\ +\ 1\,3 \\ \hline \end{array}$

8. $\begin{array}{r} 5\,6 \\ +\ 1\,4 \\ \hline \end{array}$
9. $\begin{array}{r} 7\,3 \\ +\ 2\,8 \\ \hline \end{array}$
10. $\begin{array}{r} 4\,6 \\ +\ 4\,5 \\ \hline \end{array}$
11. $\begin{array}{r} 2\,7 \\ +\ 6\,4 \\ \hline \end{array}$
12. $\begin{array}{r} 5\,8 \\ +\ 3\,6 \\ \hline \end{array}$

13. If you got one wrong, can you find the mistake?
If you got more than two wrong, what do you need to do?

14. Bill was a clock watcher.
He practised his music
24 minutes before school
and 36 minutes after school.
How long did he practise in all?

15. Sue was a clock watcher too.
She practised her music
35 minutes before school
and 25 minutes after school.
How long did she practise in all?

16. Jake earned 65 cents one day.
He earned 25 cents another day.
Did he earn enough money
to buy a 90-cent model car?

17. June earned 45 cents one day.
She earned 50 cents another day.
Did she earn enough money
to buy a 79-cent book?

Remember this?
It's the paper-saving form for addition.

$$\begin{array}{rr|l} & 1 & 0 \\ & 1 & \\ & 5 & 7 \\ + & 2 & 9 \\ \hline & 8 & 6 \end{array}$$

Add the ones.
Add the tens.

Somebody made a lot of mistakes on this page. He did the problems as shown in the example above, but every answer except one is wrong. Look for the mistakes. Copy the problems. Show how to do them right.

1. $\begin{array}{rr|l} & 1 & \\ & 5 & 2 \\ + & 2 & 9 \\ \hline & 8 & 0 \end{array}$

2. $\begin{array}{rr|l} & 6 & 3 \\ + & 3 & 7 \\ \hline & 9 & 0 \end{array}$

3. $\begin{array}{rr|l} & 1 & \\ & 2 & 6 \\ + & 6 & 9 \\ \hline & 9 & 4 \end{array}$

4. $\begin{array}{rr|l} & 2 & \\ & 4 & 5 \\ + & 3 & 7 \\ \hline & 9 & 1 \end{array}$

5. $\begin{array}{rr|l} & 1 & \\ & 6 & 2 \\ + & 2 & 5 \\ \hline & 9 & 7 \end{array}$

6. $\begin{array}{rr|l} & 1 & \\ & 7 & 7 \\ + & 1 & 7 \\ \hline & 9 & 6 \end{array}$

7. $\begin{array}{rr|l} & 1 & \\ & 3 & 6 \\ + & 2 & 9 \\ \hline & 6 & 5 \end{array}$

8. $\begin{array}{rr|l} & 2 & \\ & 4 & 8 \\ + & 4 & 4 \\ \hline & 10 & 1 \end{array}$

Talk about these.

9. What mistake was made on problem 4? problem 8?
Does any addition fact have an answer greater than 18?

10. What mistake was made on problem 1? problem 3? problem 6?
What can a person do about mistakes like these?

11. What mistake was made on problem 5?

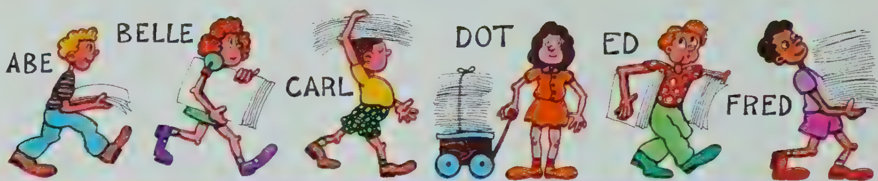
12. What mistake was made on problem 2?

1. Free-throw contest. Two rounds.
Two best scorers go to finals.
Which two will go to the finals?

30 shots each round

Scores						
	Round 1	25	19	24	29	21
	Round 2	17	25	16	15	19

2. Paper drive. Two days.
Bring all you can carry.
Who brought the least?



1st day	25	36	44	50	38	29
2nd day	37	29	28	26	25	37

Here's a challenge. Can you find how much in all?

3. The packing boxes hold 100 cartons. Each box is partly full.

Already in box	25	25	25	25	25	25
Add this many more	57	68	85	59	76	74

How many have more than 100?

How many tens in 70? How many tens in 50?
How many tens in 70 and 50 together?

$$\begin{array}{r} 70 \\ +\,50 \\ \hline \end{array}$$

How many hundreds in 120? Is this right? →

$$\begin{array}{rrr} & 7 & 0 \\ + & 5 & 0 \\ \hline 1 & 2 & 0 \end{array}$$

YOU TRY IT

$$\begin{array}{r} 90 \\ +\,80 \\ \hline \end{array} \qquad \begin{array}{r} 60 \\ +\,70 \\ \hline \end{array} \qquad \begin{array}{r} 65 \\ +\,71 \\ \hline \end{array} \qquad \begin{array}{r} 54 \\ +\,61 \\ \hline \end{array}$$

1. Save some writing time. Use h for hundreds, t for tens, and o for ones.

a $\begin{array}{r} 90 \\ +\,20 \\ \hline \end{array}$ **b** $\begin{array}{r} 80 \\ +\,50 \\ \hline \end{array}$ **c** $\begin{array}{r} 70 \\ +\,80 \\ \hline \end{array}$ **d** $\begin{array}{r} 50 \\ +\,60 \\ \hline \end{array}$ **e** $\begin{array}{r} 70 \\ +\,30 \\ \hline \end{array}$

2. Now see if you can add tens and ones.

a $\begin{array}{r} 68 \\ +\,81 \\ \hline \end{array}$ **b** $\begin{array}{r} 84 \\ +\,75 \\ \hline \end{array}$ **c** $\begin{array}{r} 93 \\ +\,53 \\ \hline \end{array}$ **d** $\begin{array}{r} 71 \\ +\,48 \\ \hline \end{array}$ **e** $\begin{array}{r} 65 \\ +\,64 \\ \hline \end{array}$

One more time. This time add hundreds, too. This won't be hard.

$$\begin{array}{r|c|c|c} & \text{hundreds} & \text{tens} & \text{ones} \\ & 2 & 5 & 6 \\ + & & 4 & 2 \\ \hline & 2 & 9 & 8 \end{array}$$

Add ones.
Add tens.
Add hundreds.

Ooops! No hundreds to add to the two hundreds.
But don't forget about the hundreds that are there.

You do these.

1. $\begin{array}{r|c|c|c} & h & t & o \\ & 3 & 4 & 7 \\ + & & 3 & 1 \\ \hline & & & \end{array}$
2. $\begin{array}{r|c|c|c} & h & t & o \\ & 5 & 2 & 9 \\ + & & 7 & 0 \\ \hline & & & \end{array}$
3. $\begin{array}{r|c|c|c} & h & t & o \\ & 6 & 0 & 8 \\ + & & 9 & 1 \\ \hline & & & \end{array}$
4. $\begin{array}{r|c|c|c} & h & t & o \\ & 8 & 1 & 3 \\ + & & 5 & 6 \\ \hline & & & \end{array}$
5. $\begin{array}{r|c|c|c} & h & t & o \\ & 4 & 3 & 5 \\ + & & 6 & 4 \\ \hline & & & \end{array}$
6. $\begin{array}{r|c|c|c} & h & t & o \\ & 2 & 6 & 0 \\ + & & 2 & 8 \\ \hline & & & \end{array}$

You did not have to rename the ones in the last row.
You will rename ones in this row.

7. $\begin{array}{r|c|c|c} & h & t & o \\ & 4 & 3 & 6 \\ + & & 1 & 6 \\ \hline & & & \end{array}$
8. $\begin{array}{r|c|c|c} & h & t & o \\ & 2 & 5 & 8 \\ + & & 2 & 4 \\ \hline & & & \end{array}$
9. $\begin{array}{r|c|c|c} & h & t & o \\ & 5 & 2 & 7 \\ + & & 6 & 5 \\ \hline & & & \end{array}$
10. $\begin{array}{r|c|c|c} & h & t & o \\ & 3 & 1 & 4 \\ + & & 7 & 9 \\ \hline & & & \end{array}$
11. $\begin{array}{r|c|c|c} & h & t & o \\ & 6 & 7 & 4 \\ + & & 1 & 7 \\ \hline & & & \end{array}$
12. $\begin{array}{r|c|c|c} & h & t & o \\ & 7 & 0 & 3 \\ + & & 5 & 8 \\ \hline & & & \end{array}$

You will rename tens in this row. Look out!

13. $\begin{array}{r|c|c|c} & h & t & o \\ & 1 & 8 & 4 \\ + & & 6 & 2 \\ \hline & & & \end{array}$
14. $\begin{array}{r|c|c|c} & h & t & o \\ & 1 & 9 & 5 \\ + & & 2 & 3 \\ \hline & & & \end{array}$
15. $\begin{array}{r|c|c|c} & h & t & o \\ & 6 & 7 & 3 \\ + & & 7 & 3 \\ \hline & & & \end{array}$
16. $\begin{array}{r|c|c|c} & h & t & o \\ & 8 & 2 & 2 \\ + & & 8 & 7 \\ \hline & & & \end{array}$
17. $\begin{array}{r|c|c|c} & h & t & o \\ & 5 & 6 & 7 \\ + & & 5 & 2 \\ \hline & & & \end{array}$
18. $\begin{array}{r|c|c|c} & h & t & o \\ & 3 & 5 & 6 \\ + & & 9 & 1 \\ \hline & & & \end{array}$

What happens now?

You know this →
$$\begin{array}{r} 6 \\ +\ 9 \\ \hline \end{array}$$

And this →
$$\begin{array}{rr} & \scriptstyle 1 \\ 5 & 6 \\ + & 9 \\ \hline \end{array}$$

And this →
$$\begin{array}{rrr} \scriptstyle 1 & \scriptstyle 1 & \\ & 5 & 6 \\ + & 7 & 9 \\ \hline \end{array}$$

And this →
$$\begin{array}{rrr} \scriptstyle 1 & & \\ 1 & 6 & 2 \\ + & 8 & 1 \\ \hline \end{array}$$

Try this

Use the paper-saving form.

$$\begin{array}{rrrr} & \scriptstyle 1 & \scriptstyle 1 & \\ & 1 & 5 & 6 \\ + & 1 & 7 & 9 \\ \hline \scriptstyle 3 & \blacksquare & 3 & 5 \end{array}$$

← First add the ones.
Then add the tens.
Finish by adding the hundreds.

Practise some by yourself.

1. $\begin{array}{r} 135 \\ +\ 78 \\ \hline \end{array}$
2. $\begin{array}{r} 259 \\ +\ 64 \\ \hline \end{array}$
3. $\begin{array}{r} 179 \\ +\ 35 \\ \hline \end{array}$
4. $\begin{array}{r} 346 \\ +\ 65 \\ \hline \end{array}$
5. $\begin{array}{r} 585 \\ +\ 77 \\ \hline \end{array}$
6. $\begin{array}{r} 167 \\ +\ 69 \\ \hline \end{array}$
7. $\begin{array}{r} 435 \\ +\ 92 \\ \hline \end{array}$
8. $\begin{array}{r} 345 \\ +\ 70 \\ \hline \end{array}$
9. $\begin{array}{r} 183 \\ +\ 82 \\ \hline \end{array}$
10. $\begin{array}{r} 274 \\ +\ 74 \\ \hline \end{array}$
11. $\begin{array}{r} 493 \\ +\ 65 \\ \hline \end{array}$
12. $\begin{array}{r} 572 \\ +\ 67 \\ \hline \end{array}$

13. There were 564 adults' tickets sold. There were 95 children's tickets sold. How many tickets were sold in all?

14. There was room for 625 to sit on chairs. 75 more could sit on benches. How many people could be seated?

Now you can do this too.

Here's the longer form.

$$\begin{array}{rccl}
 & h & t & o \\
 & 3 & 4 & 8 \\
+ & 1 & 9 & 4 \\
\hline
 & & 1 & 2 \quad \text{Add ones.} \\
 & 1 & 3 & \quad \text{Add tens.} \\
 & 4 & & \quad \text{Add hundreds.} \\
\hline
 & 5 & 4 & 2 \quad \text{In all}
\end{array}$$

Here's the paper-saving form.

$$\begin{array}{rccl}
 & h & t & o \\
 & 1 & 1 & \\
 & 3 & 4 & 8 \\
+ & 1 & 9 & 4 \\
\hline
 & 5 & 4 & 2
\end{array}$$

Add ones.
Add tens.
Add hundreds.

Try the paper-saving form to add these if you can.

1.
$$\begin{array}{rccc}
 & h & t & o \\
 & 7 & 4 & 4 \\
+ & 1 & 9 & 8 \\
\hline
\end{array}$$

Add ones.
Add tens.
Add hundreds.

2.
$$\begin{array}{rccc}
 & h & t & o \\
 & 5 & 3 & 8 \\
+ & 3 & 7 & 6 \\
\hline
\end{array}$$

Add ones.
Add tens.
Add hundreds.

3. $\begin{array}{r} 454 \\ +\,487 \\ \hline \end{array}$ **4.** $\begin{array}{r} 690 \\ +\,140 \\ \hline \end{array}$ **5.** $\begin{array}{r} 583 \\ +\,179 \\ \hline \end{array}$ **6.** $\begin{array}{r} 428 \\ +\,281 \\ \hline \end{array}$ **7.** $\begin{array}{r} 359 \\ +\,278 \\ \hline \end{array}$

8. $\begin{array}{r} 444 \\ +\,167 \\ \hline \end{array}$ **9.** $\begin{array}{r} 705 \\ +\,128 \\ \hline \end{array}$ **10.** $\begin{array}{r} 455 \\ +\,156 \\ \hline \end{array}$ **11.** $\begin{array}{r} 248 \\ +\,162 \\ \hline \end{array}$ **12.** $\begin{array}{r} 437 \\ +\,363 \\ \hline \end{array}$

Are you making progress? Don't forget to ask for help if you need it.

There really aren't many rules in addition. You have to know the addition facts.
You have to know the value of each digit.
Then you add.

$$\begin{array}{r|r|r} h & t & o \\ 1 & 3 & 5 \\ + & 5 & 7 \\ \hline ? & ? & ? \end{array}$$

First add the ones.
Then add the tens.
And then add the hundreds.

1. $$\begin{array}{r|r|r} h & t & o \\ 3 & 6 & 2 \\ +\ 1 & 4 & 7 \\ \hline & & \end{array}$$

Add ones.
Add tens.
Add hundreds.

2. $$\begin{array}{r|r|r} h & t & o \\ 5 & 6 & 8 \\ + & 5 & 3 \\ \hline & & \end{array}$$

Add ones.
Add tens.
Add hundreds.

3. $$\begin{array}{r|r|r} h & t & o \\ 2 & 3 & 8 \\ +\ 1 & 9 & 7 \\ \hline & & \end{array}$$

Add ones.
Add tens.
Add hundreds.

4. Have you ever been bowling? Some kids we know went the other day. They each rolled two games. Who had the highest score?

	Tom	Dick	Harry	June	Sally
Game 1	125	67	100	97	105
Game 2	78	49	110	39	109

5. Some big brothers and sisters went along too. Who had high score?

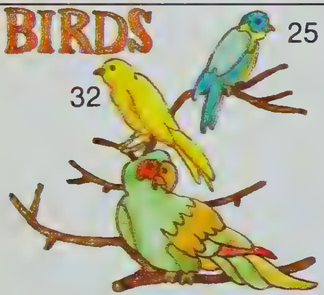
	Tom's sister	Dick's brother	Harry's brother	June's sister	Sally's brother
Game 1	169	181	225	105	125
Game 2	173	149	178	125	173

It was a great pet shop. It had everything.
The owner had to count how many things she had. Please help.

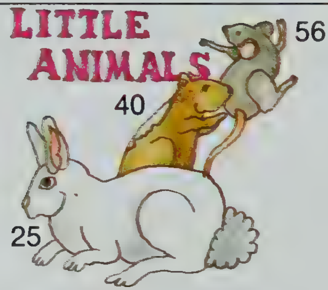
1 How many dogs in all?

2 How many cats in all?

3 How many toys in all?



4 How many birds in all?

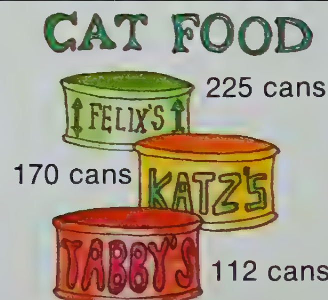


5 How many animals in all?

6 How many fish in all?

7 How many boxes in all?

8 How many cans in all?



9 How many cans in all?

SHOW HOW GOOD YOU ARE

1	Add 23 to each of these numbers.	**a** 32	**b** 43	**c** 54	**d** 65	**e** 76	**f** 87
2	Add 65 to each of these numbers.	**a** 22	**b** 33	**c** 44	**d** 55	**e** 66	**f** 77
3	Add 34 to each of these numbers.	**a** 12	**b** 24	**c** 48	**d** 96	**e** 192	**f** 384
4	Add 99 to each of these numbers.	**a** 1	**b** 10	**c** 11	**d** 100	**e** 101	**f** 111
5	Add 111 to each of these numbers.	**a** 123	**b** 345	**c** 567	**d** 789	**e** 899	**f** 999

Here is something extra. Try it if you have time.

ADD

6
$$\begin{array}{r} 23 \\ 14 \\ +\ 32 \\ \hline \end{array}$$

7
$$\begin{array}{r} 16 \\ 42 \\ +\ 21 \\ \hline \end{array}$$

8
$$\begin{array}{r} 25 \\ 15 \\ +\ 52 \\ \hline \end{array}$$

9
$$\begin{array}{r} 142 \\ 235 \\ +\ 322 \\ \hline \end{array}$$

10
$$\begin{array}{r} 561 \\ 215 \\ +\ 120 \\ \hline \end{array}$$

11
$$\begin{array}{r} 436 \\ 354 \\ +\ 206 \\ \hline \end{array}$$

CHECKOUT

Keep on using the longer form of addition if you want to.
You can save paper in other ways.

You have a goal.
You're going to get good at adding any two numbers.
Have you reached that goal yet? Prove it. Do these steps.

1. First step

a	b	c	d	e	f
8 + 7	4 + 7	7 + 0	9 + 5	6 + 9	8 + 3

2. Second step

70 + 20	60 + 30	40 + 40	50 + 20	90 + 20	80 + 40

3. Third step

56 + 20	28 + 50	39 + 40	52 + 25	61 + 26	46 + 53

4. Fourth step

24 + 28	47 + 29	35 + 28	56 + 56	34 + 87	69 + 45

5. Fifth step

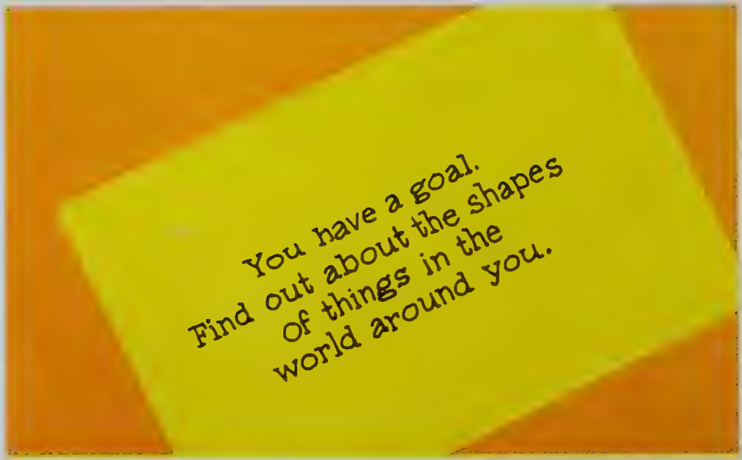
a 128 + 146 **b** 568 + 83 **c** 377 + 249 **d** Make up three more problems. Then find the answers too.

4

GEOMETRY SHAPES

Look around the classroom.
Pick three different objects that you can hold in your hands.

Describe what they feel like.
Describe what they look like.
Tell why you think they are shaped the way they are.



You can feel a surface with your hands.

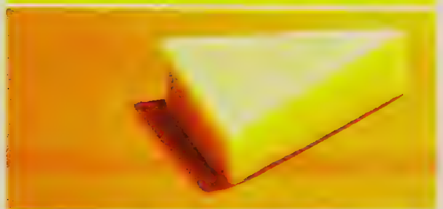
1. How many flat surfaces does this box have?
2. How many curved surfaces does it have?

You can feel an edge with your finger.

3. How many edges does a box have?

4. How many flat surfaces does this orange have?
5. How many curved surfaces does it have?
6. How many edges does it have?

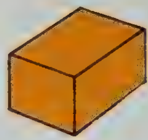
7. How many flat surfaces does this can have?
8. How many curved surfaces does it have?
9. How many edges does it have?



10. How many flat surfaces does this hunk of cheese have?
11. How many curved surfaces does it have?
12. How many edges does it have?

13. How many flat surfaces does this ice-cream cone have?
14. How many curved surfaces does it have?
15. How many edges does it have?
16. A flat surface of a solid object is also called a *face*. What happens when two faces meet?

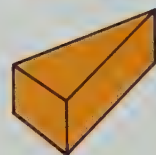
You can feel a sharp point or a corner with your finger.



1. How many sharp points does a box have?
2. How many sharp points on the box have three edges meeting?

3. How many sharp points does a ball have?
4. How many sharp points on the ball have three edges meeting?

5. How many sharp points does a can have?
6. How many sharp points on the can have three edges meeting?



7. How many sharp points does a wedge have?
8. How many sharp points on the wedge have three edges meeting?

9. How many sharp points does a cone have?
10. How many points on the cone have three edges meeting?

A sharp point on a solid object is called a *vertex*. Whenever three edges meet, there is always a vertex. (The plural of *vertex* is *vertices*—two or more vertices.)

Can there ever be a vertex without three edges meeting? Think about the cone.

1. Take a box.

   a Trace *one* of the edges with paper and pencil.
   Your tracing is called a *line segment*.

   b Trace another one of the edges.
   This is another line segment.

   c Trace two line segments that join at a corner.

   d Trace one of the faces with pencil and paper.

   e Does your tracing have any straight parts?

   f Does it have any curved parts?

2. Take an unopened can.

   a Trace a part of an edge with paper and pencil.
   This is *not* a line segment because it is curved.

   b Trace one of the faces with pencil and paper.

   c Does your tracing have any straight parts?

   d Does it have any curved parts?

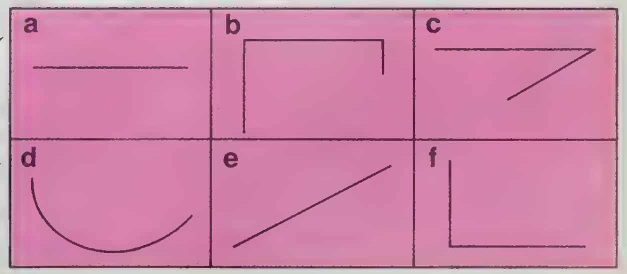
Plane figures are made up of straight parts and curved parts.
Each straight part is called a *side* of the figure.
The point where *straight* sides meet forms a corner.

3. Take your two tracings.

   a Mark each straight side with a ✓.

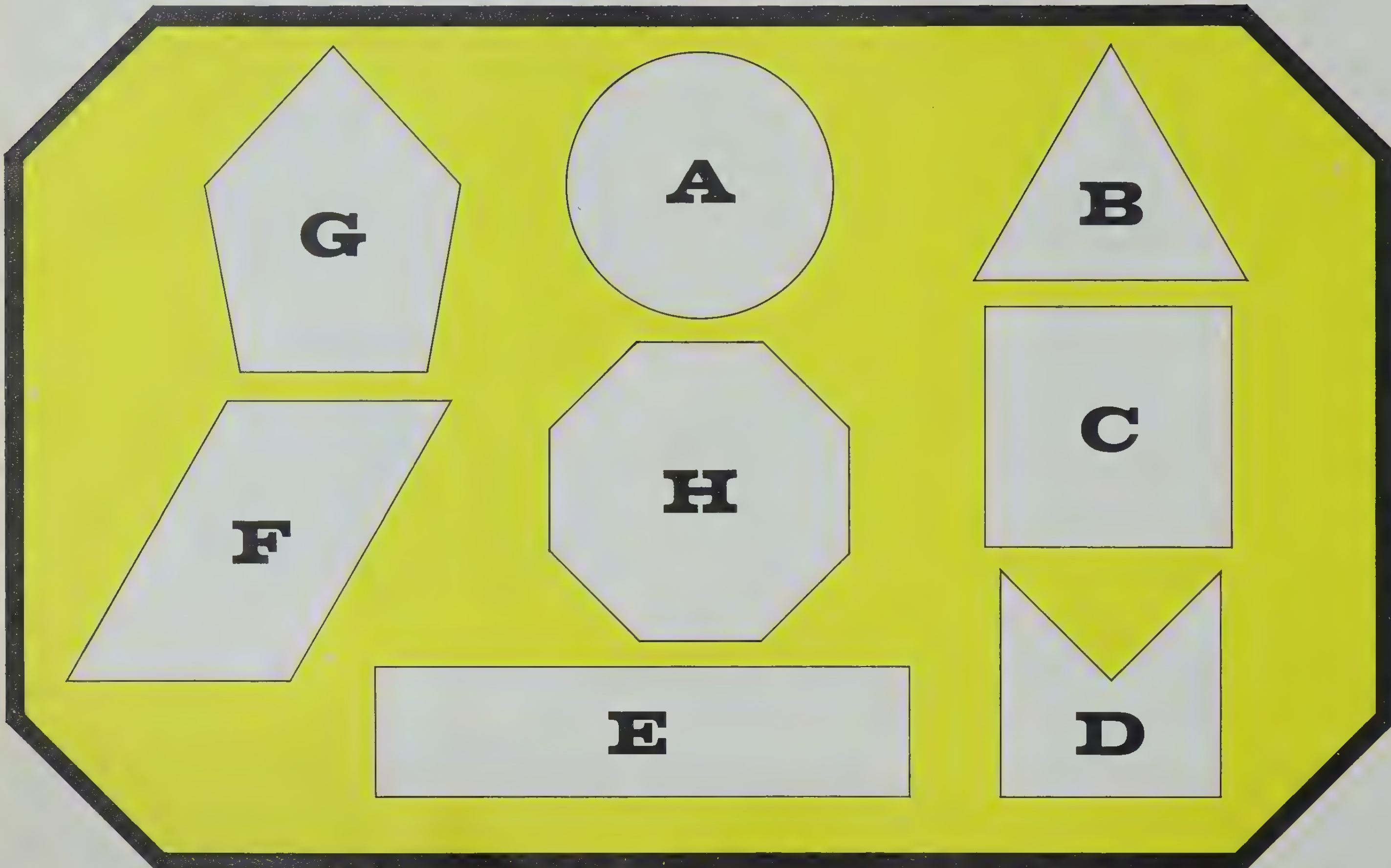
   b Mark each corner with an ✕.

4. Which of these are line segments?



1. How many straight sides does each plane figure have?

2. How many corners does each plane figure have?



3. Look at each figure with all straight sides. Are there the same number of sides as there are corners?

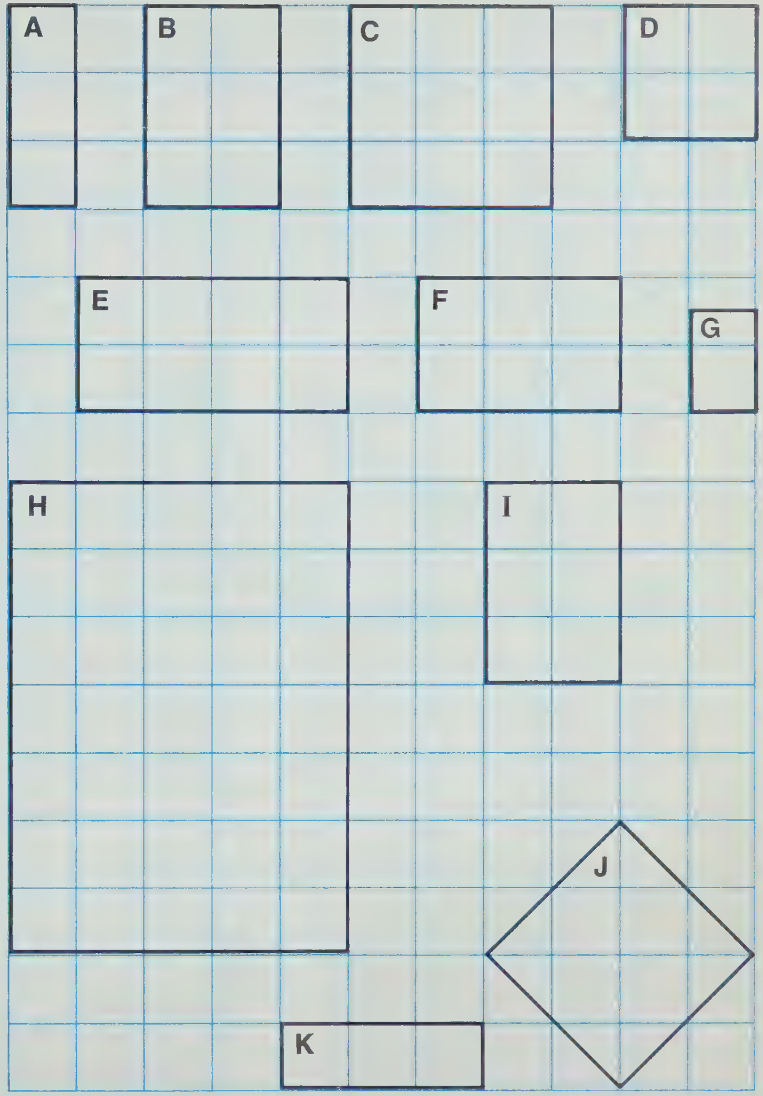
1. Are these plane figures?
2. How many sides does each figure have?
3. How many corners does each figure have?

These plane figures are called *rectangles.*

4. Look again. Which plane figures have all four sides the same length?

A rectangle with all four sides the same length is called a *square.*

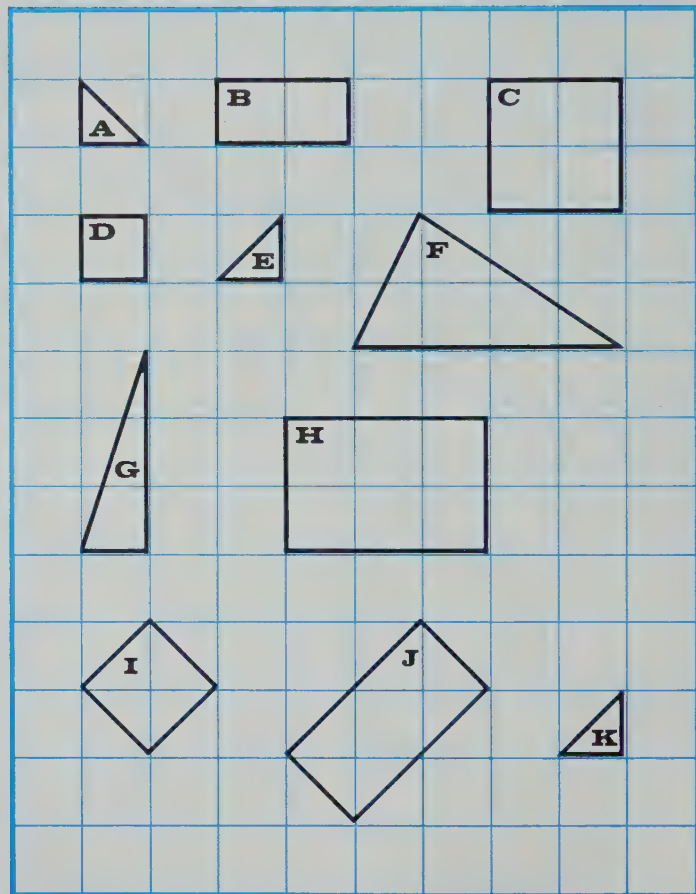
5. Name the rectangles that are squares in the picture.

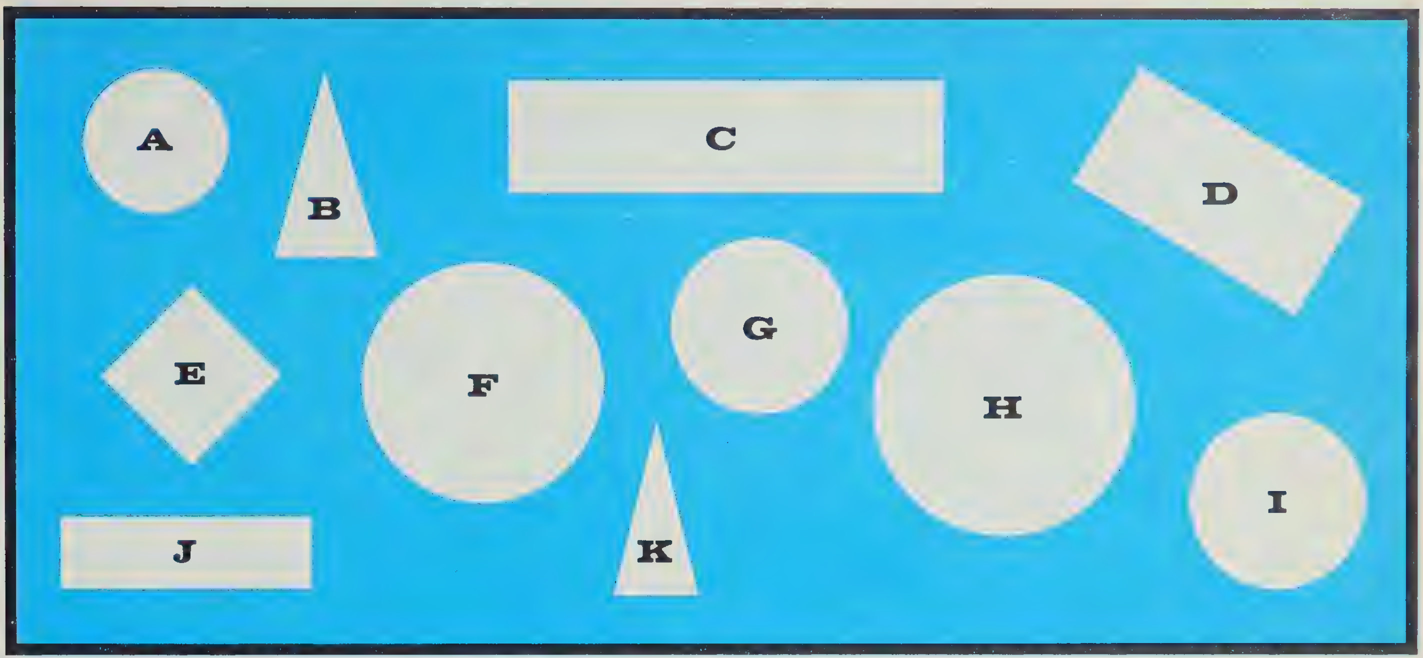


1. Which of these figures are rectangles?
2. Are any of the rectangles squares?
3. Name the plane figures that are not rectangles.
   - a How many sides does each of these figures have?
   - b How many corners does each figure have?

A plane figure with 3 sides and 3 corners is called a *triangle.*

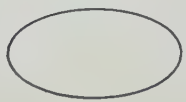
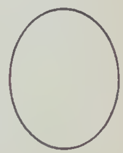
4. Name the triangles in the picture.
5. Do any of the triangles pictured have the same size?
6. Draw a rectangle on your paper.
7. Draw a triangle on your paper.
8. How is the rectangle like the triangle? How is it different?



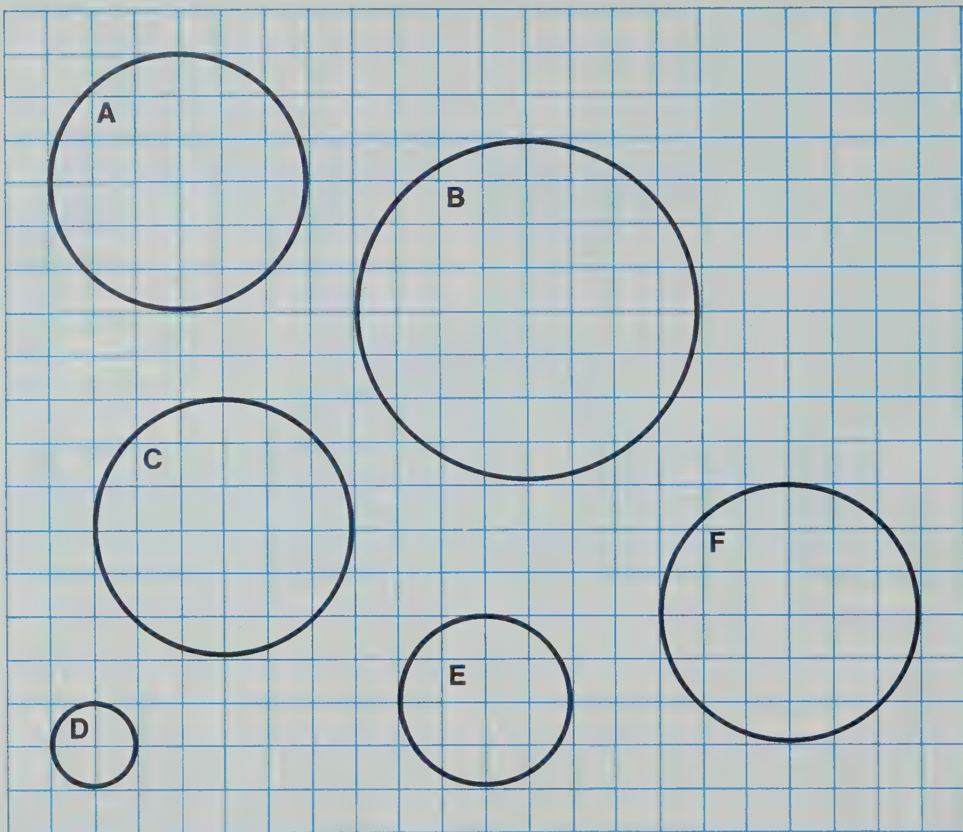


1. Are all these figures plane figures?
2. Which figures have corners?
3. Which figures have 4 square corners?
4. Which figures have 4 sides the same length?
5. Name the triangles.
6. Name the plane figures that are not rectangles or triangles.
   a Do any of them have straight sides?
   b Do any of them have corners?

A plane figure that is perfectly round is called a *circle*.

7. Do any of the circles pictured have the same size?
8. Is this a circle?  Is this a circle? 

1. Are all the figures on this page the same shape?



2. Which circle covers the most surface?

3. What happens when you try to count the number of squares each circle covers?

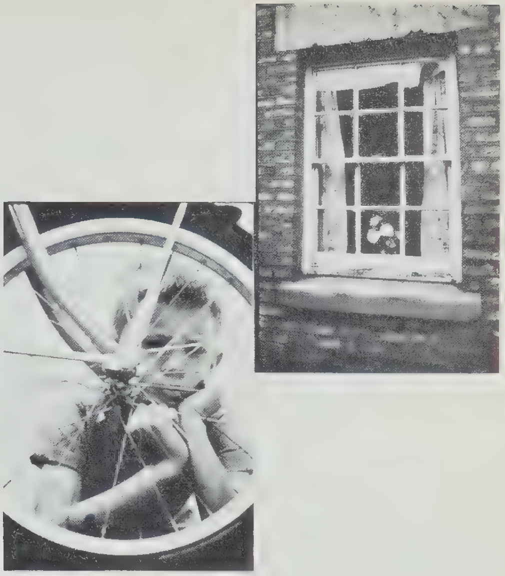
4. Can you find out *about* how many squares are covered?

5. Name the circles that look the same size.

6. There are at least two ways that you could make sure two circles are the same size. Can you figure out at least one way?

Talk about these.

1. WHY are most windows shaped like a rectangle?
2. WHY are doors shaped like rectangles?
3. WHY are some tables round?
4. WHY is a book shaped like a rectangle?
5. WHY is a wheel shaped like a circle?
6. WHY is the brim of a hard hat curved? Why isn't it the shape of a circle?
7. WHY do most boxes have flat surfaces?
8. WHY can a sandwich be cut to form two triangular shapes as well as two rectangular shapes?



CHECKOUT

What shapes can you find in your room?

5 SUBTRACTION

Here is an incomplete story. You finish it. Find good words for the and the right numbers to put in place of the

Mom said I was getting selfish.
She said I had to learn to share.
I looked at all the things I had
And was surprised at what was there.

I had 8
I gave 2 to my sister Sue.
I now had remaining,
So I really wasn't blue.

I wanted 22
I kept 12 behind my closet door.
I gave away.
Then I wished that I had more.

There were 25
I had to give 9 to my cousin Jill.
There were only left
To share with my cousin Bill.

Sue was so pleased, she gave me 5
And Jay gave me 6 too.
Cousin Bill and cousin Jill shared 10
Now what am I to do?

Your story may not have made sense, but you did some arithmetic that should have made sense. That arithmetic is part of the goal you will want to reach in this chapter.

YOUR GOAL

is to gain skill in subtracting.

You will want to know your progress. Keep score. Some sets of problems will have this symbol.

It is a Superstar. It signals you to keep a record of the number of problems you get correct. You'll also want to keep track of your total score for all sets of Superstar problems. Your goal is to earn 100 points.

Here is the first Superstar set of problems. Put your paper under the first row. Then write your answers on your paper. Fold your answers under. Then you will be ready for the second row.

There are 9 cans of soda pop in the refrigerator. You and your friends drink 5 of them. How many remain?

$$\begin{array}{r} 9 \\ -\ 5 \\ \hline ? \end{array}$$

	a	b	c	d	e	f	g
1.	$\begin{array}{r} 9 \\ -\ 4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -\ 7 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -\ 3 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -\ 0 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -\ 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -\ 6 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -\ 2 \\ \hline \end{array}$
2.	$\begin{array}{r} 7 \\ -\ 1 \\ \hline \end{array}$	$\begin{array}{r} 3 \\ -\ 1 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ -\ 6 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ -\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ -\ 3 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ -\ 4 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ -\ 3 \\ \hline \end{array}$

How many points?

1. Imagine soda pop coming 10 cans in a carton. A grocery store has 50 cans. Your father buys 20 of them. How many remain at the store?

5 tens	5 0
− 2 tens	− 2 0
3 tens →	3 0

	a	b	c	d
1.	6 0 − 5 0	9 0 − 6 0	5 0 − 3 0	4 0 − 3 0
2.	7 0 − 4 0	6 0 − 6 0	8 0 − 1 0	9 0 − 5 0

That was your practice.
Now earn some more points.

3.	6 0 − 4 0	9 0 − 7 0	7 0 − 5 0	7 0 − 6 0
4.	5 0 − 4 0	8 0 − 3 0	6 0 − 2 0	9 0 − 3 0

How many remain?

$$\begin{array}{r} 11 \\ -\ 5 \\ \hline ? \end{array}$$

	a	b	c	d	e	f	g
1.	$\begin{array}{r} 11 \\ -\ 6 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ -\ 3 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ -\ 2 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ -\ 9 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ -\ 7 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ -\ 8 \\ \hline \end{array}$	$\begin{array}{r} 11 \\ -\ 4 \\ \hline \end{array}$
2.	$\begin{array}{r} 13 \\ -\ 9 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ -\ 8 \\ \hline \end{array}$	$\begin{array}{r} 14 \\ -\ 5 \\ \hline \end{array}$	$\begin{array}{r} 15 \\ -\ 6 \\ \hline \end{array}$	$\begin{array}{r} 10 \\ -\ 6 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ -\ 9 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ -\ 8 \\ \hline \end{array}$
3.	$\begin{array}{r} 14 \\ -\ 8 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ -\ 7 \\ \hline \end{array}$	$\begin{array}{r} 15 \\ -\ 9 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ -\ 8 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ -\ 9 \\ \hline \end{array}$	$\begin{array}{r} 15 \\ -\ 8 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ -\ 9 \\ \hline \end{array}$

Total score now?

Look at $\begin{array}{r} 29 \\ -\ 8 \\ \hline ? \end{array}$ Are there any tens in 29?

$$\begin{array}{r|l} \text{tens} & \text{ones} \\ 2 & 9 \\ - & 8 \\ \hline \blacksquare & \blacksquare \end{array}$$

Try these. Subtract.

	a	b	c	d	e	f	g
4.	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 2 & 8 \\ - & 4 \\ \hline \end{array}$	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 3 & 9 \\ - & 7 \\ \hline \end{array}$	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 5 & 7 \\ - & 3 \\ \hline \end{array}$	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 9 & 9 \\ - & 5 \\ \hline \end{array}$	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 6 & 5 \\ - & 4 \\ \hline \end{array}$	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 5 & 5 \\ - & 5 \\ \hline \end{array}$	$\begin{array}{r\|l} \text{tens} & \text{ones} \\ 3 & 7 \\ - & 6 \\ \hline \end{array}$

1. Would you be satisfied if—

   a You bought a bag of candy for 31 cents, you gave the clerk 51 cents, and you got back 10 cents change?

   b You bought a model car for 69 cents, you gave the clerk 75 cents, and you got back 6 cents change?

   c You bought a book for 49 cents, you gave the clerk 55 cents, and you got back 5 cents change?

   d You bought a hamburger for 55 cents, you gave the cashier 75 cents, and you got back 15 cents in change?

   e You bought a can of pop for 10 cents, you put a quarter in the machine, and you got back a dime in change?

2. What coins could you have in your pocket if you had 35 cents?

3. What coins could you have in your bank if you had 75 cents?

4. What coins could you use to pay for a ticket that cost 50 cents?

5. What coins could you get if you got paid 25 cents for an errand?

6. Could you have only three coins and have—

   a 16 cents? b 31 cents? c 56 cents? d 45 cents?

The cartons were full.
There were 4 extra cans. 54 in all.
3 cartons and 1 can were used.
How many remain?

$$\begin{array}{r|l} \text{tens} & \text{ones} \\ 5 & 4 \\ -\ 3 & 1 \\ \hline ? & ? \end{array}$$

	a	b	c	d
	tens | ones	tens | ones	tens | ones	tens | ones
1.	$\begin{array}{r} 68 \\ -\ 27 \\ \hline \end{array}$	$\begin{array}{r} 44 \\ -\ 32 \\ \hline \end{array}$	$\begin{array}{r} 72 \\ -\ 52 \\ \hline \end{array}$	$\begin{array}{r} 97 \\ -\ 63 \\ \hline \end{array}$
2.	$\begin{array}{r} 38 \\ -\ 24 \\ \hline \end{array}$	$\begin{array}{r} 66 \\ -\ 51 \\ \hline \end{array}$	$\begin{array}{r} 84 \\ -\ 23 \\ \hline \end{array}$	$\begin{array}{r} 57 \\ -\ 34 \\ \hline \end{array}$

3. How many cartons?

a How many cans in all the cartons?

b Can we rename 110 as 11 tens?

c Can we rename 160 as 16 tens?

4. Rename as tens.

a 150 **b** 120 **c** 220

d 170 **e** 190 **f** 340

How many remain?

hundreds	tens	ones		
1	1	0	How many tens in 110? →	11 0
−	3	0	How many tens in 30? →	− 3 0
?	?	?	How many ones in the answer?	■ ■
			How many tens in the answer?	

	a	b	c	d
	tens | ones	tens | ones	tens | ones	tens | ones
1.	14 0	17 0	13 0	15 0
	− 9 0	− 8 0	− 7 0	− 7 0

How many remain?

12 5
− 5 3
■ ■

	a	b	c	d	e	f	g
	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones
2.	13 6	12 9	15 4	11 8	10 7	14 7	16 9
	− 8 5	− 4 4	− 8 3	− 3 8	− 7 5	− 7 6	− 9 6

How many Superstar points do you have so far?

Can you work these problems without any mistakes?
Make more points. Use the folded-paper idea for your answers.

1. $\begin{array}{r} 70 \\ -\ 50 \\ \hline \end{array}$

2. $\begin{array}{r} 60 \\ -\ 40 \\ \hline \end{array}$

3. $\begin{array}{r} 90 \\ -\ 30 \\ \hline \end{array}$

4. $\begin{array}{r} 130 \\ -\ 50 \\ \hline \end{array}$

5. $\begin{array}{r} 140 \\ -\ 60 \\ \hline \end{array}$

6. $\begin{array}{r} 120 \\ -\ 90 \\ \hline \end{array}$

7. $\begin{array}{r} 93 \\ -\ 32 \\ \hline \end{array}$

8. $\begin{array}{r} 75 \\ -\ 51 \\ \hline \end{array}$

9. $\begin{array}{r} 89 \\ -\ 76 \\ \hline \end{array}$

10. $\begin{array}{r} 117 \\ -\ 44 \\ \hline \end{array}$

11. $\begin{array}{r} 136 \\ -\ 95 \\ \hline \end{array}$

12. $\begin{array}{r} 145 \\ -\ 60 \\ \hline \end{array}$

13. $\begin{array}{r} 158 \\ -\ 83 \\ \hline \end{array}$

14. $\begin{array}{r} 142 \\ -\ 52 \\ \hline \end{array}$

15. $\begin{array}{r} 165 \\ -\ 74 \\ \hline \end{array}$

Total score so far?

If you got one wrong, can you find your mistake? Have you made that mistake before? If you got more than two wrong, what do you need to do?

Suppose the store now has 42 cans of soda pop in all.
There are 4 cartons and 2 extra cans on the shelf.
You and your friends buy 7 cans.
How many are left?

How many tens?
How many ones?
Can you take away 7
when you have only 2?

	4 tens 2
−	7
	NO!

The clerk had to empty a carton to get enough.

	3 tens 12
	4 tens 2
−	7
	? tens ?

Now how many tens?
How many ones?
Can you subtract 7 now?
How many ones? How many tens?

$$\begin{array}{rr} & 3\ \ 12 \\ & \cancel{4}\ \ \cancel{2} \\ - & 7 \\ \hline \end{array}$$

You will need to copy these problems. Then work them.

1.	2.	3.	4.	5.	6.	7.
35	63	51	84	77	62	93
− 7	− 6	− 4	− 5	− 9	− 8	− 9

Here is another way to think about cans of soda pop.

tens	ones	
5	3	← How many tens? How many ones?
−	9	
NO!		

tens	ones	
4	13	
5	3	← Now how many tens? How many ones?
−	9	Now subtract.
■	■	How many ones? How many tens?

Are you ready for a Superstar set of problems? Subtract.

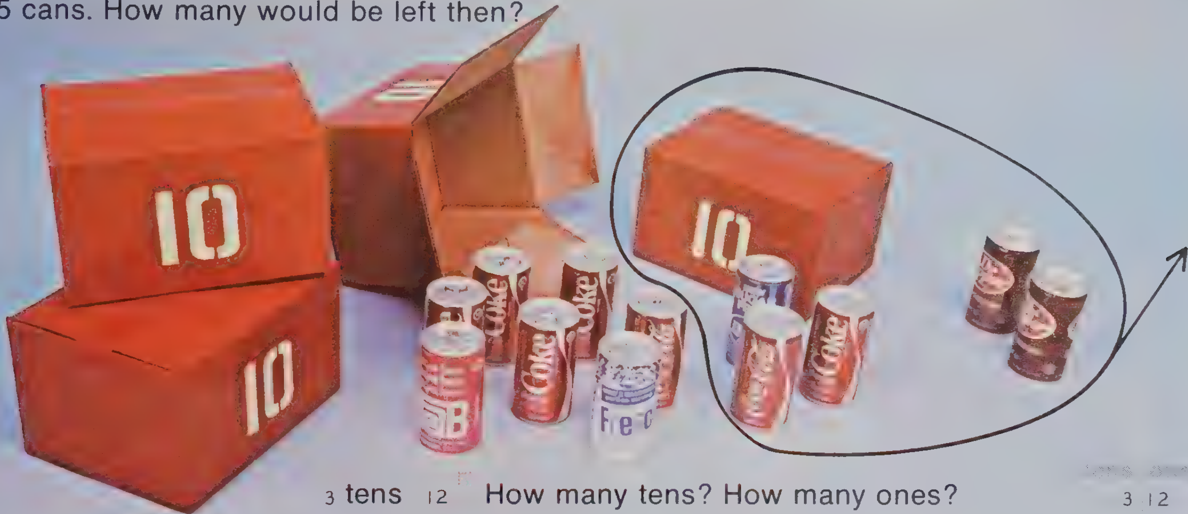
	a	b	c	d
	tens ones	tens ones	tens ones	tens ones
1.	53 − 6	31 − 5	65 − 7	44 − 9
2.	91 − 3	72 − 8	35 − 6	50 − 3

Total score so far?

Find the mistakes. What are the right answers?

	a	b	c	d
3.	54 − 9 = 55	42 − 5 = 33	60 − 8 = 58	36 − 7 = 29

Remember those 4 cartons and 2 extra cans of soda pop on the shelf? Suppose you and your friends bought 15 cans. How many would be left then?



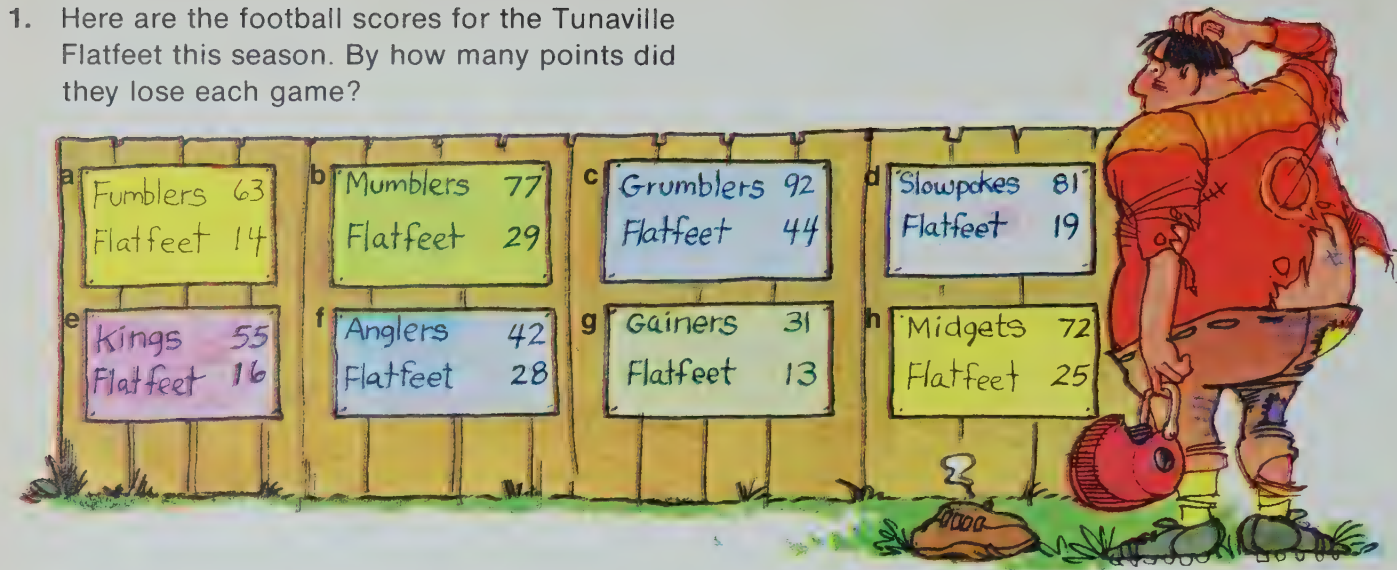
	^{3} tens	^{12}	How many tens? How many ones?
	~~4 tens~~	~~2~~	
−	1 ten	5	Subtract.
	? tens	?	Now how many ones? How many tens?

tens	ones
3	12
~~4~~	~~2~~
− 1	5
■	■

Your turn. Copy and complete.

	a	b	c	d	e	f
	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones
1.	5 3 − 2 6	6 1 − 1 8	7 4 − 5 7	3 2 − 1 5	5 7 − 2 9	7 8 6 − 5 8
2.	4 0 − 2 1	9 5 − 3 6	7 2 − 4 5	3 6 − 1 7	6 1 − 2 7	9 0 − 3 3

1. Here are the football scores for the Tunaville Flatfeet this season. By how many points did they lose each game?



i In which game did the Flatfeet lose by the most points?
In which game did they lose by the least points?

Are you ready? Get set. Go! Subtract.

	a	b	c	d
2.	$\begin{array}{r} 31 \\ -\ 17 \\ \hline \end{array}$	$\begin{array}{r} 72 \\ -\ 43 \\ \hline \end{array}$	$\begin{array}{r} 55 \\ -\ 28 \\ \hline \end{array}$	$\begin{array}{r} 47 \\ -\ 39 \\ \hline \end{array}$
3.	$\begin{array}{r} 73 \\ -\ 58 \\ \hline \end{array}$	$\begin{array}{r} 84 \\ -\ 29 \\ \hline \end{array}$	$\begin{array}{r} 51 \\ -\ 16 \\ \hline \end{array}$	$\begin{array}{r} 46 \\ -\ 17 \\ \hline \end{array}$

Now how many in all?

Answer each question.

Don't worry. The tax is already part of the price.

1. You bought a comb for 29 cents.
   You had 50 cents.
   Can you also buy a book for 21 cents?

2. You got a loaf of bread for supper.
   That cost 35 cents. You had 75 cents.
   Can you also buy ice cream that costs 39 cents?

3. You want to go to the movies. A ticket costs 65 cents. You can get a ride there, but you have to take a bus home. That costs 25 cents. You have 90 cents. Do you have enough money?

These questions have to do with the clock.

4. You have 60 minutes before bedtime.
   You have to practise for 20 minutes.
   Do you have time to watch a 30-minute TV program?

5. You know your homework will take more than 15 minutes. You are to be at a friend's house in 30 minutes. It takes 10 minutes to get there. Will you be late?

6. You have one hour. You play for 45 minutes.
   How many minutes do you have left?

three hundred forty-five

3 hundred 4 tens 5 ones → 345

345 could be named 34 tens 5 ones.

two hundred seventy-one

2 hundred 7 tens 1 one → 271

271 could be named 27 tens 1 one.

1. Rename as tens and ones.

a 125 **b** 196 **c** 205 **d** 164 **e** 111

Sometimes we use this idea when we subtract.

There are 123 cans of pop in all.
There are 12 cartons and 3 cans.
87 are sold. How many remain?

	12 tens 3
−	8 tens 7
	? tens **NO** You have to open a carton.

THIS IS WHAT YOU THINK

	11 tens 13
	~~12 tens 3~~
−	8 tens 7
	? tens ?

THIS IS WHAT YOU WRITE

	1	13
	~~12~~	~~3~~
−	8	7
	■	■

2. In which problems will you have to "open a carton of ten"?

	a	b	c	d	e
	13 5	18 4	16 7	15 8	14 2
	− 7 8	− 9 1	− 3 4	− 3 9	− 6 5

You just decided *when* to rename a ten as ones in order to subtract. That is an important decision to make.

1. Don't subtract. Just tell how each number has to be renamed.

a	b	c	d	e	f	g
12 3	15 6	11 0	10 8	17 1	13 5	16 7
− 3 5	− 6 8	− 5 6	− 2 9	− 7 3	− 4 7	− 5 8

2. You should be ready to subtract. Try these.

14 2	13 0	10 4	18 5	15 7	12 4	17 1
− 8 4	− 4 7	− 2 5	− 9 6	− 7 8	− 3 5	− 9 6

3. Joe did three problems. He got three wrong. Look at his paper. Can you help him?

1.	2.	3.
11 0	12 1	15 2
− 3	− 4 7	− 7 5
11 3 X	8 6 X	9 3 X

TALK ABOUT THESE

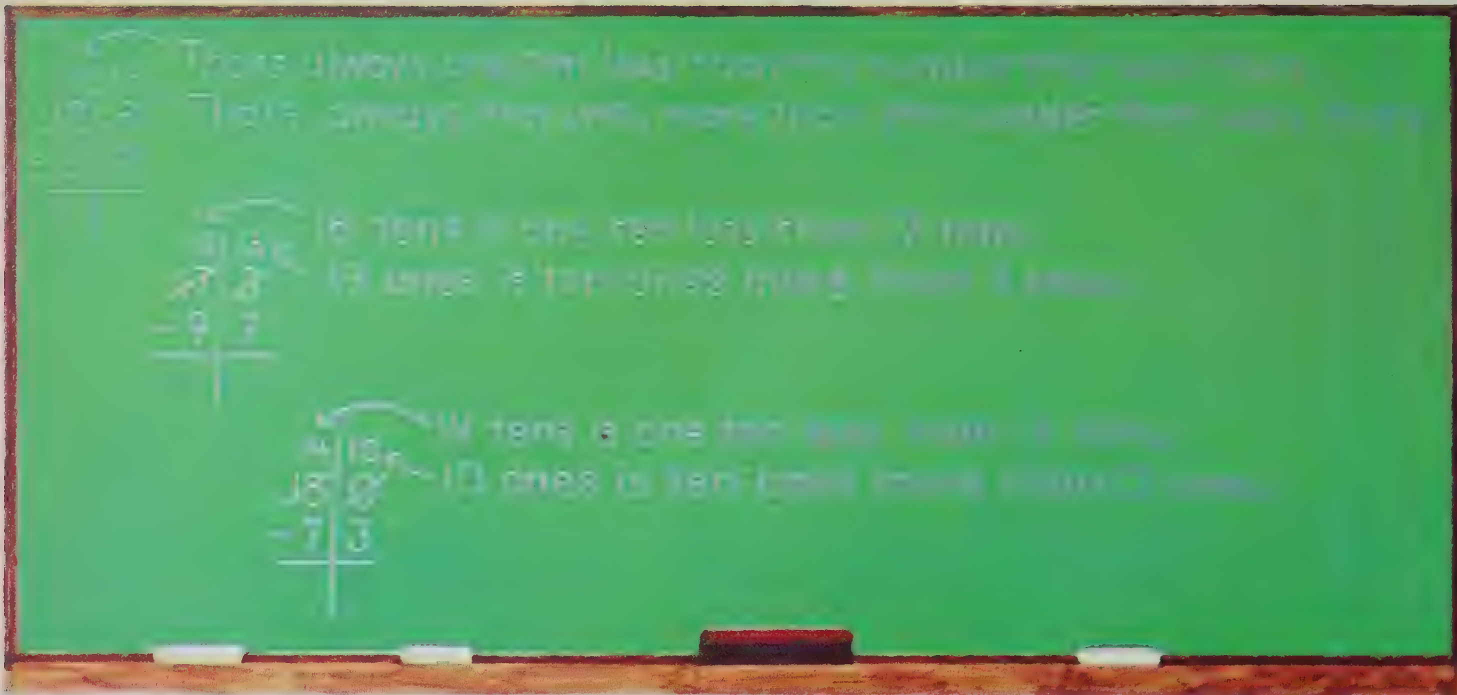
a Think about cartons and cans again. 110 would be 11 cartons. No loose cans. Could Joe take 3 cans away if he didn't open a carton?

b Look at the answer. 113 is more than the number to start with. Does that make sense?

c What mistake did Joe make in 2?

d Did he make more than one mistake in 3? What are they?

Jan did three problems. She thought she had a good idea that would help her rename for subtraction. She made out this sheet for you.



See if her idea works. Subtract these.

	a	b	c	d
1.	183 − 95	156 − 87	120 − 52	142 − 69
2.	164 − 76	117 − 49	131 − 87	175 − 96

Subtract. It's a Superstar set.

	a	b	c	d
1.	$\begin{array}{r} 143 \\ -\ 77 \\ \hline \end{array}$	$\begin{array}{r} 128 \\ -\ 69 \\ \hline \end{array}$	$\begin{array}{r} 154 \\ -\ 95 \\ \hline \end{array}$	$\begin{array}{r} 162 \\ -\ 85 \\ \hline \end{array}$
2.	$\begin{array}{r} 172 \\ -\ 98 \\ \hline \end{array}$	$\begin{array}{r} 154 \\ -\ 75 \\ \hline \end{array}$	$\begin{array}{r} 145 \\ -\ 97 \\ \hline \end{array}$	$\begin{array}{r} 136 \\ -\ 88 \\ \hline \end{array}$

What's your new total score?

3. Here are the basketball scores for the Tunaville Superstars. By how many points did they win each game?

a		b		c	
Superstars	144	Superstars	116	Superstars	125
Hustlers	57	Golddiggers	88	Beavers	79

d		e		f	
Superstars	157	Superstars	172	Superstars	140
Swingers	78	Saints	93	Satans	84

g		h		i	
Superstars	133	Superstars	152	Superstars	181
Huskies	57	Satellites	83	Hotshots	92

j In which game did the Superstars win by the most points?
In which game did they win by the least points?

54	1
− 5	9
?	**NO!**

We must rename.

BUT!

$\overset{53}{\cancel{54}}$	$\overset{11}{\cancel{1}}$
− 5	9
?	?

That answer takes extra thinking!

Look at this way of writing the problem.

	hundreds	tens	ones
	5	$\overset{3}{\cancel{4}}$	$\overset{11}{\cancel{1}}$
−		5	9
	?	?	2

Rename 1 ten.
Get enough ones.

	hundreds	tens	ones
	$\overset{4}{\cancel{5}}$	$\overset{13}{\cancel{4}}$	$\overset{11}{\cancel{1}}$
−		5	9
	?	?	2

Rename 1 hundred.
Get enough tens.
How many tens in 1 hundred?
Now finish.

Copy these problems on your paper. You will have a lot of renaming to do.
Use h for hundreds. Use t for tens and o for ones.

	h	t	o
1.	5	6	7
−		8	9

	h	t	o
2.	3	2	3
−		4	5

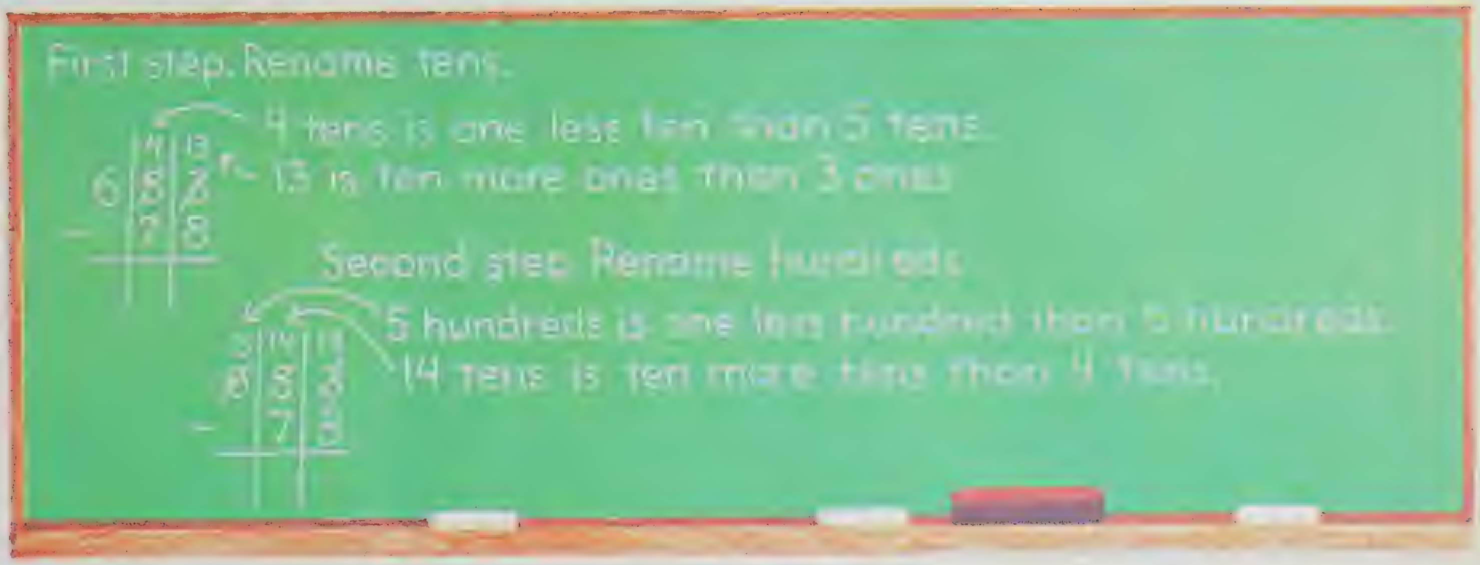
	h	t	o
3.	2	5	7
−		8	8

	h	t	o
4.	3	5	2
−		7	4

	h	t	o
5.	4	3	1
−		4	7

How did you do? Don't be afraid to ask questions.
You need to understand what's happening before you practise.

Is Jan's idea of any use
for problems like these?



Think about Jan's idea as you do these subtraction problems.

	a	b	c	d	e	f
1.	426 − 48	526 − 57	324 − 95	527 − 68	736 − 48	237 − 89
2.	256 − 57	362 − 99	475 − 96	503 − 75	543 − 64	640 − 57

Practise some more. Show all your work on your paper.

1. $\begin{array}{r} 14 \\ -\ \ 7 \\ \hline \end{array}$	2. $\begin{array}{r} 24 \\ -\ \ 7 \\ \hline \end{array}$	3. $\begin{array}{r} 240 \\ -\ 70 \\ \hline \end{array}$	4. $\begin{array}{r} 249 \\ -\ 76 \\ \hline \end{array}$
5. $\begin{array}{r} 16 \\ -\ \ 8 \\ \hline \end{array}$	6. $\begin{array}{r} 46 \\ -\ \ 8 \\ \hline \end{array}$	7. $\begin{array}{r} 460 \\ -\ 80 \\ \hline \end{array}$	8. $\begin{array}{r} 467 \\ -\ 84 \\ \hline \end{array}$
9. $\begin{array}{r} 12 \\ -\ \ 9 \\ \hline \end{array}$	10. $\begin{array}{r} 72 \\ -\ \ 9 \\ \hline \end{array}$	11. $\begin{array}{r} 720 \\ -\ 90 \\ \hline \end{array}$	12. $\begin{array}{r} 726 \\ -\ 91 \\ \hline \end{array}$

Now try these problems.

	a	b	c	d
13.	$\begin{array}{r} 342 \\ -\ 71 \\ \hline \end{array}$	$\begin{array}{r} 723 \\ -\ 32 \\ \hline \end{array}$	$\begin{array}{r} 449 \\ -\ 77 \\ \hline \end{array}$	$\begin{array}{r} 516 \\ -\ 73 \\ \hline \end{array}$
14.	$\begin{array}{r} 937 \\ -\ 82 \\ \hline \end{array}$	$\begin{array}{r} 408 \\ -\ 75 \\ \hline \end{array}$	$\begin{array}{r} 654 \\ -\ 93 \\ \hline \end{array}$	$\begin{array}{r} 843 \\ -\ 51 \\ \hline \end{array}$

You are getting closer. What total today?

Subtract. Show all your work on your paper.

1. $\begin{array}{r} 14 \\ -\ 8 \\ \hline \end{array}$	**2.** $\begin{array}{r} 34 \\ -\ 8 \\ \hline \end{array}$	**3.** $\begin{array}{r} 340 \\ -\ 80 \\ \hline \end{array}$	**4.** $\begin{array}{r} 345 \\ -\ 86 \\ \hline \end{array}$
5. $\begin{array}{r} 12 \\ -\ 7 \\ \hline \end{array}$	**6.** $\begin{array}{r} 52 \\ -\ 7 \\ \hline \end{array}$	**7.** $\begin{array}{r} 520 \\ -\ 70 \\ \hline \end{array}$	**8.** $\begin{array}{r} 523 \\ -\ 79 \\ \hline \end{array}$
9. $\begin{array}{r} 14 \\ -\ 9 \\ \hline \end{array}$	**10.** $\begin{array}{r} 84 \\ -\ 9 \\ \hline \end{array}$	**11.** $\begin{array}{r} 840 \\ -\ 90 \\ \hline \end{array}$	**12.** $\begin{array}{r} 841 \\ -\ 98 \\ \hline \end{array}$

Try working these problems.

	a	b	c	d
13.	$\begin{array}{r} 723 \\ -\ 59 \\ \hline \end{array}$	$\begin{array}{r} 287 \\ -\ 99 \\ \hline \end{array}$	$\begin{array}{r} 305 \\ -\ 76 \\ \hline \end{array}$	$\begin{array}{r} 647 \\ -\ 79 \\ \hline \end{array}$
14.	$\begin{array}{r} 543 \\ -\ 94 \\ \hline \end{array}$	$\begin{array}{r} 478 \\ -\ 99 \\ \hline \end{array}$	$\begin{array}{r} 213 \\ -\ 65 \\ \hline \end{array}$	$\begin{array}{r} 743 \\ -\ 74 \\ \hline \end{array}$

What's your new total?

It was a busy little store. You decide what things they sell. You figure out how many they have to sell. [redacted] is your choice.

1

They had 144 packages of [redacted]. They sold 55. How many packages of [redacted] do they have left?

2

They ordered 250 [redacted]. 26 got broken. How many [redacted] do they have to sell?

3

They had too many [redacted]. 753 in all. They had only sold 38. They wanted to get rid of all of them. How many [redacted] did they put on sale?

4

Somebody made a mistake. They ordered 125 [redacted]. They got 736. How many [redacted] too many did they get?

5

There were 175 [redacted] on the counter. Clumsy Clancey spilled water. Only 138 didn't get wet. How many [redacted] did Clumsy Clancey ruin?

6

They had 350 [redacted]. Somebody wanted 425. How many more [redacted] did they need?

1

Complete the subtraction puzzles. Subtract the number on the left from each number across the top.

a

–	93	714	155
64	29	650	?
27	?	?	?
48	?	?	?

b

–	127	85	541
36	?	?	?
54	?	?	?
79	?	?	?

2

Answer the questions.

a Harry wants to buy a 45¢ milkshake. He has 37¢. How much more does he need?

b He drops his money and loses 15¢. How much does he need now for his milkshake?

c Beth gives him 20¢. Can he buy the milkshake now?

CHECKOUT

Can you work these problems without making mistakes? Try it.

1. $\begin{array}{r} 52 \\ -\ \ 6 \\ \hline \end{array}$

2. $\begin{array}{r} 31 \\ -\ \ 8 \\ \hline \end{array}$

3. $\begin{array}{r} 74 \\ -\ \ 5 \\ \hline \end{array}$

4. $\begin{array}{r} 64 \\ -\ 29 \\ \hline \end{array}$

5. $\begin{array}{r} 72 \\ -\ 17 \\ \hline \end{array}$

6. $\begin{array}{r} 84 \\ -\ 59 \\ \hline \end{array}$

7. $\begin{array}{r} 124 \\ -\ \ 85 \\ \hline \end{array}$

8. $\begin{array}{r} 147 \\ -\ \ 98 \\ \hline \end{array}$

9. $\begin{array}{r} 131 \\ -\ \ 65 \\ \hline \end{array}$

10. $\begin{array}{r} 316 \\ -\ \ 72 \\ \hline \end{array}$

11. $\begin{array}{r} 943 \\ -\ \ 71 \\ \hline \end{array}$

12. $\begin{array}{r} 556 \\ -\ \ 62 \\ \hline \end{array}$

13. $\begin{array}{r} 445 \\ -\ \ 97 \\ \hline \end{array}$

14. $\begin{array}{r} 324 \\ -\ \ 55 \\ \hline \end{array}$

15. $\begin{array}{r} 517 \\ -\ \ 78 \\ \hline \end{array}$

Do you have the 100 points you needed? If you don't, you can still earn them.

6

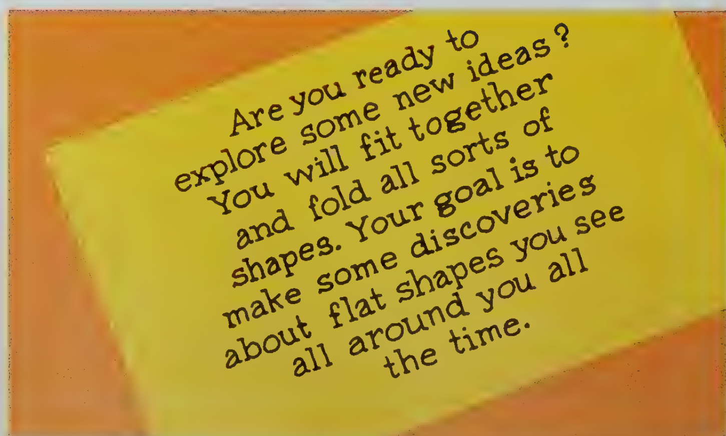
GEOMETRY SYMMETRY

Humpty Dumpty had a great fall.
All the king's horses and all the king's men,
Couldn't put Humpty together again.

Had Humpty been a squarehead rather than an egghead, he might have been put together again.

In the set of pieces –

1. How many different sizes are there?
2. How many small pieces would cover one of the bigger pieces?
3. Find pieces that are like these. Fit them together. What shapes can you make?



1. Do you think shapes like this would fit together? Trace, cut, and try it.

2. Would these shapes fit together? Trace, cut, and try it.

Use some of the same pieces you used before. You'll need both rectangles and squares. Can you fit them together so that they form a rectangular shape that is not a square? Try it!

LOOK AROUND YOU

Can you find squares or rectangles that fit together to make a larger shape?

Look at school!

How about—
- the windows?
- the floor?
- the ceiling?

Look at home!

What about—
- the kitchen?
- the bathroom?
- the bedroom?

Look when you go to the store.
Look when you walk home.

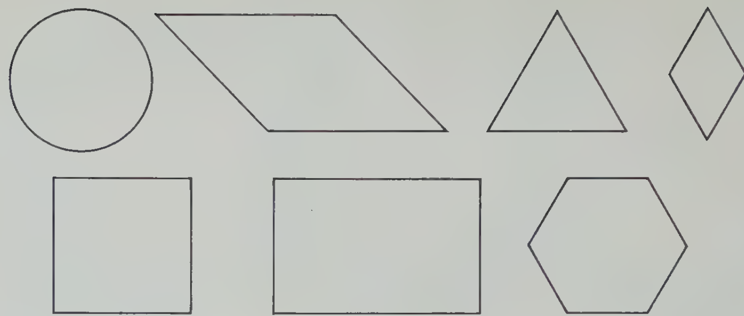
Keep a record of all the different patterns you find.

Talk about this page.

1. Which shapes do you think would fit together best? Can you name them?

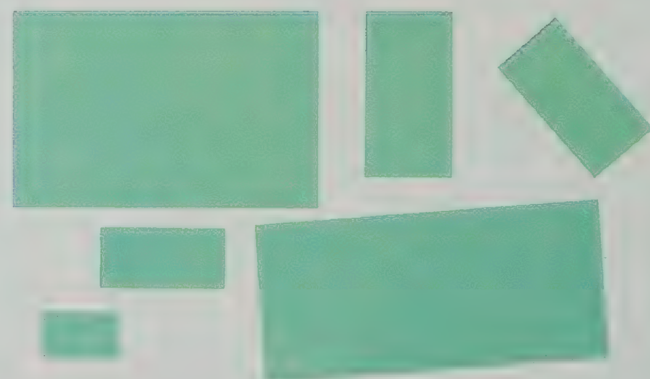
2. What is alike about the shapes that fit together best?

3. Which shapes can be put together to make a rectangular shape? Prove it.



4. How many squares?

5. How many rectangles?



6. What about these?

   a How are the squares and rectangles alike?

   b How are they different?

   c Can a square be a different size and still be a square?

   d Can a square be a different shape and still be a square?

   e Can a rectangle be a different size and still be a rectangle?

   f Can a rectangle be a different shape and still be a rectangle?

You can find square corners in other shapes, too. First you have to have something to test a corner to make sure that it is square. Find a small sheet of paper.

Fold it.

Now fold again so that the fold goes over on itself **AND** now you have a square-corner tester.

How many corners does this shape have?
How many square corners? Slide your tester into each corner.
Does any corner match the tester?

Try your square-corner tester here.
How many square corners in each shape?

1.

2.

3.

4.

5. Unfold your tester. How many square corners can you find where the fold marks are?

A rectangle has four square corners. The opposite sides of a rectangle are the same length. What about the length of the sides of a square?

1. Measure each side of each square.

What is true about the length of each side of a square?

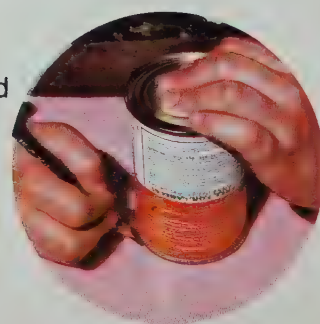
2. Trace the square that has the longest side. Cut out the square.

   a Can you fold it so that one half matches the other half?

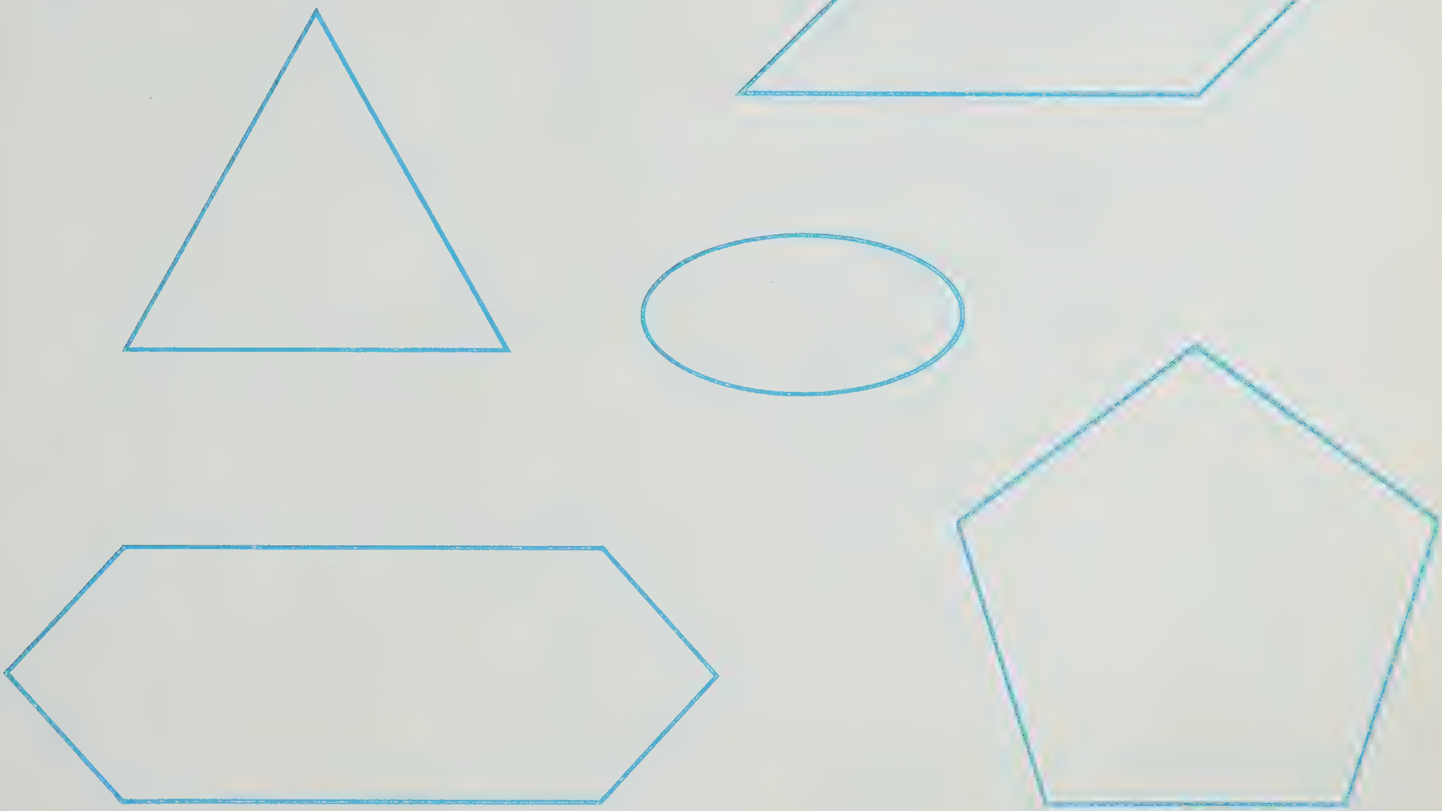
   b Can you fold it another way so that one half matches the other half? How many ways can you find in all?

3. Find a large rectangle that is not a square. Trace it. Cut it out. How many ways can you find to fold this shape so that one half matches the other half?

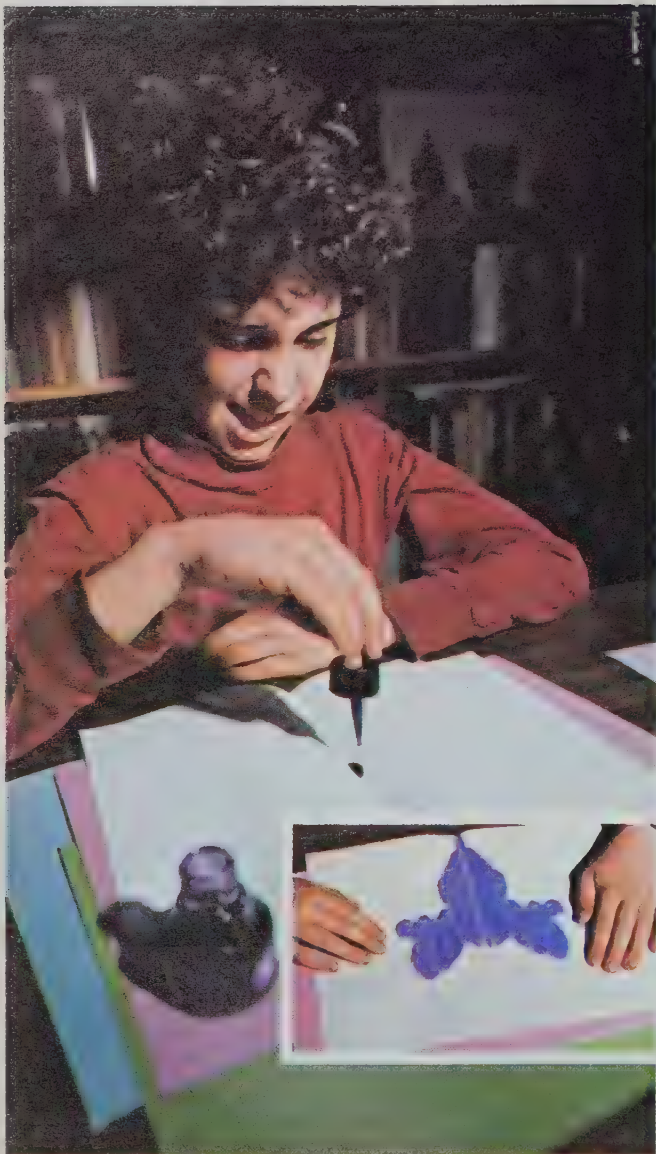
4. Find a jar or can. Draw around the circular face. Cut out the shape. This is a big job. How many ways can you find to fold it so that one half matches the other half?



Trace each one of these shapes. Cut each out. How many different ways can you find to fold each of these so that one half matches the other half?



When you can fold a shape at least once so that one half matches the other half, you can say the figure has *symmetry*. The fold line is called the *line of symmetry*.



You will need pieces of plain paper and some kind of paint or ink such as you use in art class.

Fold the paper so that one half matches the other half.

Open the paper.

Put *one* big drop of paint somewhere close to the middle *on* the fold mark.

Close the paper quickly. Rub the paper about where the drop of paint is.

Open the paper. The paint has made a design.
Does the design have symmetry?
Can you find the line of symmetry? Where is it?

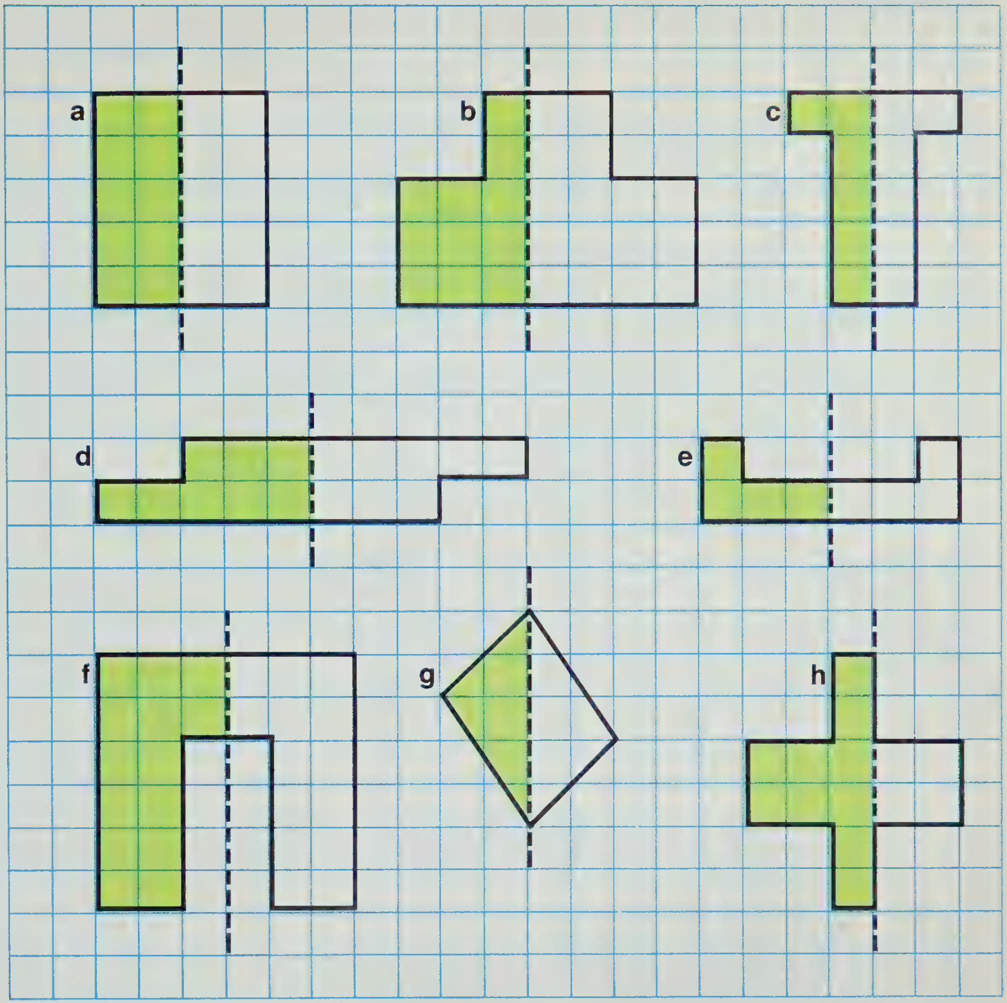
You can make many beautiful designs with just one drop of paint on the fold of paper.

You can make many designs with just paper and scissors. Try this.

Find some more plain paper. Fold the paper so that one half matches the other half. Keep the paper folded. Cut out a shape. Make sure you don't cut all the folded edge. Open the paper. Look at the hole. Open the cut-out piece.

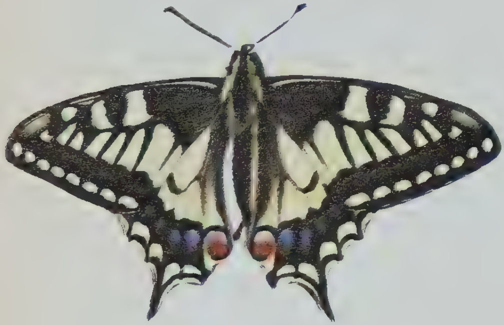
Can you find the line of symmetry?
Does the cut-out piece fit back into the hole?
Is there still a line of symmetry?

Part of a figure is outlined. Part is shaded. The dotted line is a pretend fold line. The graph paper will help you decide if the outlined part matches the shaded.



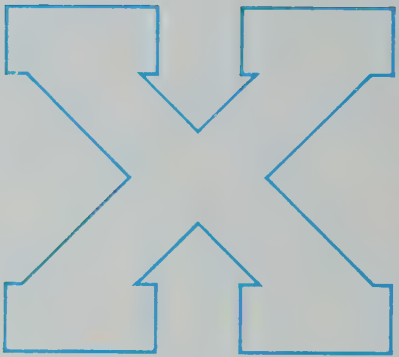
TALK ABOUT THESE.

There are many things around you that have symmetry.



Have you ever seen a butterfly? It looks as if it has symmetry.

This is a leaf. It looks as if it has symmetry.



Here is a letter of the alphabet. It looks as if it has symmetry.

CHECKOUT

LOOK AROUND YOU!

List ten things that have symmetry.

Think about—
- things in school.
- things at home.
- shapes of things that grow.
- shapes of buildings.
- shapes of people too.

7 MULTIPLICATION

You could have found
all the answers by adding.
Or you could have multiplied.
Multiplication may be faster.
Your

GOAL

is to find answers
by multiplication.
Ready! Set! Go!

1. He loved candy. Do you?
   He wanted 2 bags of lemon candy.
   How much must he pay?

2. What kind of candy do you want?
   How much must you pay?

3. She bought 5 bags of fudge.
   How much did she pay?

4. Her friend bought 1 bag of lemon,
   1 of orange, and 1 of lime.
   How much did this cost?

5. The man bought 4 bags of mints.
   How much did he pay?

REMEMBER!

$$6 \times 3 = 18$$

Tells how many sets.
It is called a factor.

Symbol for *times*.
It signals
multiplication.

Tells how many in each set.
It is also called a factor.

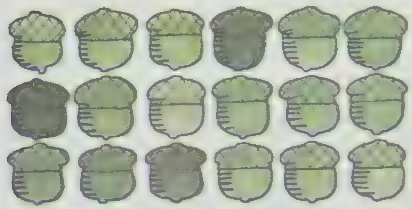
Symbol for *equals*.
What's on the left equals
what's on the right.

Tells how many in all.
This is a product.

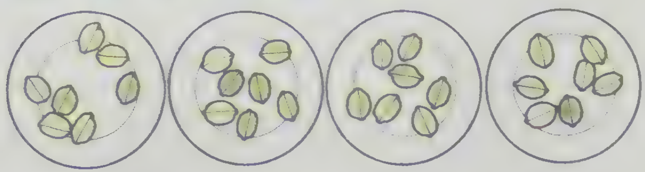
1. Answer each question.

a 5 rows of trees.
8 trees in each row.
How many trees in all?

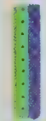
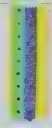
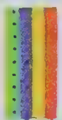
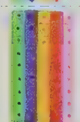
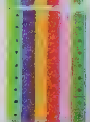
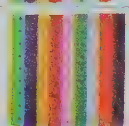
b 3 rows of acorns.
6 acorns in each row.
How many acorns in all?



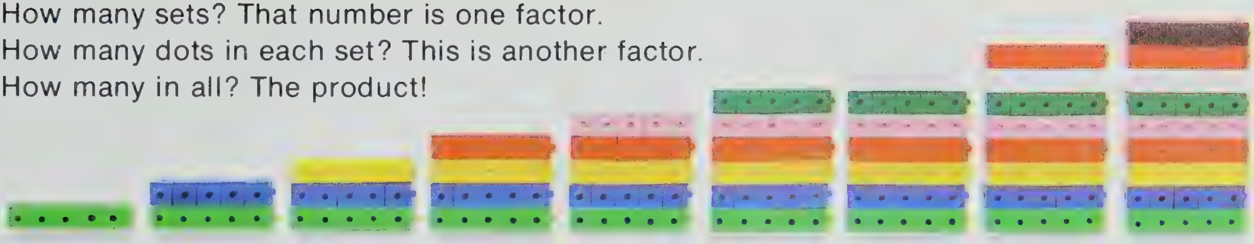
c 4 plates were there.
7 nuts on each plate.
How many nuts in all?



2. Go back. Name each factor. Tell which number is the product.

	THE ARRAY	THE WORDS	THE FACTORS	THE PRODUCT	THE FACT
1.		1 set of 9	1×9	9	$\begin{array}{r} 9 \\ \times\ 1 \\ \hline 9 \end{array}$
2.		2 sets of 9	2×9	18	$\begin{array}{r} 9 \\ \times\ 2 \\ \hline \blacksquare \end{array}$
3.		3 sets of 9	3×9	■	$\begin{array}{r} 9 \\ \times\ 3 \\ \hline \blacksquare \end{array}$
4.		4 sets of 9	4×9	■	$\begin{array}{r} 9 \\ \times\ 4 \\ \hline \blacksquare \end{array}$
5.		5 sets of 9	5×9	■	$\begin{array}{r} 9 \\ \times\ 5 \\ \hline \blacksquare \end{array}$
6.		6 sets of 9	6×9	■	$\begin{array}{r} 9 \\ \times\ 6 \\ \hline \blacksquare \end{array}$
7.		7 sets of 9	7×9	■	$\begin{array}{r} 9 \\ \times\ 7 \\ \hline \blacksquare \end{array}$
8.		8 sets of 9	8×9	■	$\begin{array}{r} 9 \\ \times\ 8 \\ \hline \blacksquare \end{array}$
9.		9 sets of 9	9×9	■	$\begin{array}{r} 9 \\ \times\ 9 \\ \hline \blacksquare \end{array}$

1. How many sets? That number is one factor.
How many dots in each set? This is another factor.
How many in all? The product!



1×5	2×5	3×5	4×5	5×5	6×5	7×5	8×5	9×5
$\begin{array}{r} 5 \\ \times\ 1 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 2 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 3 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 4 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 5 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 6 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 7 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 8 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ \times\ 9 \\ \hline \end{array}$

2. The five-facts are easy to remember.
What about the six-facts? Draw an array if you need to.

$\begin{array}{r} 6 \\ \times\ 1 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 2 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 3 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 4 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 5 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 6 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 7 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 8 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ \times\ 9 \\ \hline \end{array}$

3. Here are the seven-facts.

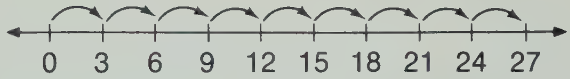
$\begin{array}{r} 7 \\ \times\ 1 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 2 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 3 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 5 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 6 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 7 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 8 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ \times\ 9 \\ \hline \end{array}$

4. And here are the eight-facts.

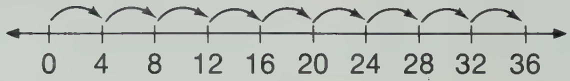
$\begin{array}{r} 8 \\ \times\ 1 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 2 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 3 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 4 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 6 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 7 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 8 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ \times\ 9 \\ \hline \end{array}$

Some people use the number line to help them remember products. The distance each ⌒ covers is one factor. The number of ⌒ is the other factor.

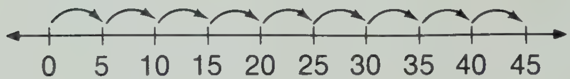
1.



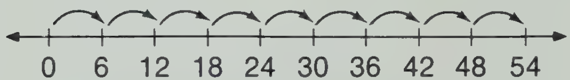
2.



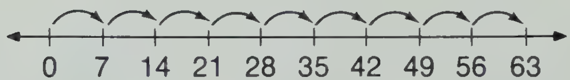
3.



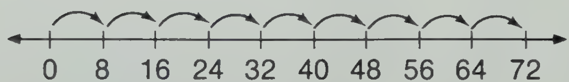
4.



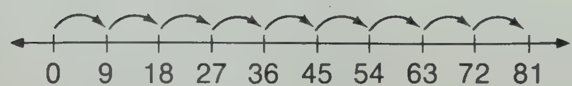
5.



6.



7.



1.	3×7	3×5	3×8	3×9	3×6
2.	4×6	4×8	4×5	4×7	4×9
3.	5×5	5×9	5×6	5×8	5×7
4.	6×8	6×5	6×9	6×6	6×7
5.	7×6	7×7	7×5	7×8	7×9
6.	8×7	8×9	8×8	8×5	8×6
7.	9×5	9×8	9×6	9×9	9×7

Get a clean sheet of paper.
Make sure it has lines marked on it.
Draw lines so that you have 11 columns.

1. If you draw lines about this far apart, you'll have space for all 11 columns.

2. Now in the third row in the third box, write 2. Start skip-counting. Count by 2s to 18.

3. Start the next row. Put 3 in the box right below the 2-box. Count by 3s to 27.

4. Keep on. Start another row. Count by 4s to 36.

5. Start with 5 in the next row. Count by 5s to 45.

6. On to the next row. Start with 6. Count by 6s to 54.

7. Start with 7 in the next row. Count by 7s to 63.

8. You're right if you guess the next row starts with 8. Count by 8s to 72.

9. And you have only one more row to do. Start with 9. Count by 9s to 81.

10. Read down the first column of numbers. What numbers do you read? Are they in the same order as the numbers you wrote in the first row?

11. Read down the second column of numbers. Are these numbers in the same order as the numbers in the first row?

1. Your paper shows all the products of the factors 2 through 9. You can't leave out the number 1, for goodness' sake! And if you have all the products, you must show the factors too.

X	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35		
6	6	12	18	24	30				
7	7	14	21	[illegible]					

← factors

← products of 1

a This column has products of 9.

b This column has products of 8.

c This column has products of 7.

d This column has products of 6.

e This column has products of 5.

f What products are shown in this column?

g What products are shown in this column?

h What products in this column?

factors

products of 1

2. This is a very useful table. You can read it two ways. Products are shown in rows also.

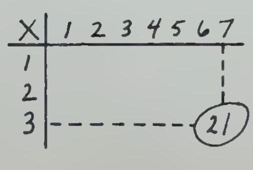
   a What products are shown in the row that starts with 3?

   b What products are shown in the row that starts with 4?

   c What products are shown in the row that starts with 6?

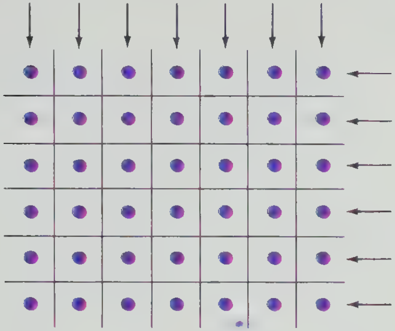
   d What products are shown in the row that starts with 9?

3. If you want to know the product of 7 and 3, read across to 7, then down to row 3.



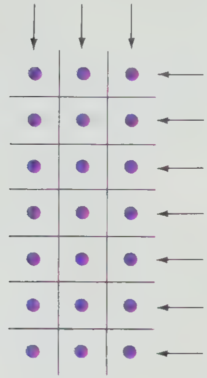
And there is the product!

1. You can look at an array two ways.
This way you see 7 sets of 6. How many in all?



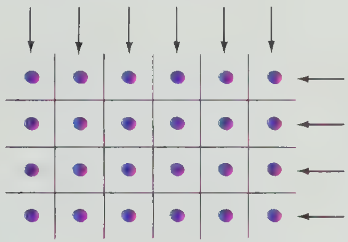
Look at it this way and you can see 6 sets of 7 dots. How many in all?

2. Look at this one this way.
You see 3 sets of 7 dots.



Look at it this way. You see 7 sets of 3 dots. How many in all?

3. What do you see?



What do you see? How many in all?

Multiply.

4.	6×5	5×6	7×5	5×7	8×5	5×8	9×5	5×9	6×7	7×6
5.	8×6	6×8	6×9	9×6	7×8	8×7	7×9	9×7	8×9	9×8

Maybe your job of learning the facts isn't so big after all.

×	1	2	3	4	5	6	7	8	9
1	□								
2		□							
3			□						
4				□					
5					□				
6						□			
7							□		
8								□	
9									□

1. What products go where the boxes are?

1 × 1	2 × 2	3 × 3	4 × 4	5 × 5
6 × 6	7 × 7	8 × 8	9 × 9	*0 × 0

×	1	2	3	4	5	6	7	8	9
1	□	2	3	4	5	6	7	8	9
2	?	□	6	8	10	12	14	16	18
3	?	?	□	12	15	18	21	24	27
4	?	a	?	□	20	24	28	32	36
5	?	?	b	?	□	30	35	40	45
6	?	c	?	d	?	□	42	48	54
7	?	?	e	?	f	?	□	56	63
8	?	?	?	?	?	g	h	□	72
9	?	?	?	i	?	j	?	k	□

2. If you know the facts on half the table, do you know them all?

What product belongs where **a** is?
What product goes in box **b**?
in **c**? in **d**? in **e**?
in **f**? in **g**? in **h**?
in **i**? in **j**? in **k**?

3. Zero is not on the table. It could be.
But you know the zero-facts, don't you? Prove it.

a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**
1 × 0	2 × 0	3 × 0	4 × 0	5 × 0	6 × 0	7 × 0	8 × 0	9 × 0

4. The one-facts are easy too.

1 × 1	4 × 1	6 × 1	3 × 1	8 × 1	5 × 1	2 × 1	9 × 1	7 × 1

Answer these.

1. 7 people.
   2 legs on each person.
   How many legs in all?

2. 9 stools.
   3 legs on each stool.
   How many legs in all?

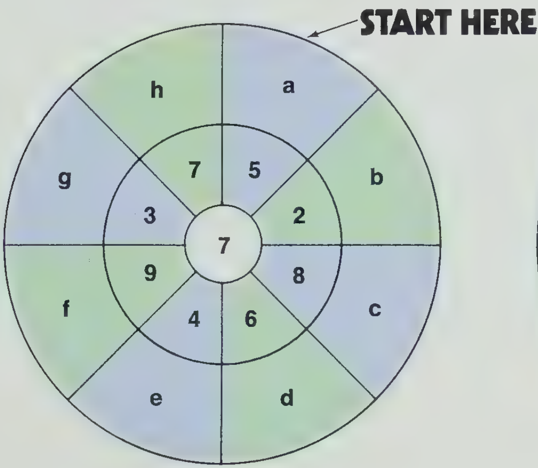
3. 8 horses.
   4 legs on each horse.
   How many legs in all?

4. 7 bugs.
   6 legs on each bug.
   How many legs in all?

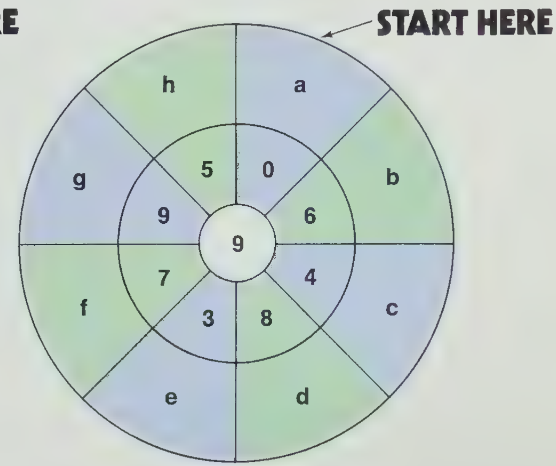
5. 5 tables.
   4 legs on each table.
   How many legs in all?

6. 6 spiders.
   8 legs on each spider.
   How many legs in all?

7. Multiply.



8. Multiply again.



9. 8 tricycles.
   3 wheels on each tricycle.
   How many wheels in all?

10. 6 planes.
    5 wheels on each plane.
    How many wheels in all?

11. 9 trucks.
    6 wheels on each truck.
    How many wheels in all?

12. 7 carts.
    4 wheels on each cart.
    How many wheels in all?

How many do YOU know?

SET I

	a	b	c	d
1.	1×2	2×3	5×2	4×3
2.	3×5	4×2	5×1	5×4
3.	3×3	2×2	5×5	4×4
4.	1×0	3×1	1×1	0×5

SET II

	a	b	c	d
1.	7×4	8×3	9×4	8×5
2.	8×4	7×5	9×3	8×2
3.	9×2	6×3	7×2	6×4
4.	9×5	6×5	7×3	6×2

Make a list of the facts that are hard. Work on them.

SET III

	a	b	c	d
1.	5×9	3×6	2×7	5×6
2.	2×9	3×7	4×6	2×6
3.	4×8	5×7	2×9	3×8
4.	3×9	4×7	4×9	5×8

SET IV

	a	b	c	d
1.	6×6	7×8	9×9	6×7
2.	9×7	7×6	8×7	6×8
3.	8×9	6×9	8×6	7×7
4.	9×6	8×8	7×9	9×8

How many in each row?
How many rows?

Count by 10s.

How many sets of 10 did you count?

THINK	WRITE
1 × 1 ten = 1 ten	1 × 10 = 10
2 × 1 ten = 2 tens	2 × 10 = ■
3 × 1 ten = 3 tens	3 × 10 = ■
4 × 1 ten = ■ tens	4 × 10 = ■
5 × 1 ten = ■ tens	5 × 10 = ■
6 × 1 ten = ■ tens	6 × 10 = ■
7 × 1 ten = ■ tens	7 × 10 = ■
8 × 1 ten = ■ tens	8 × 10 = ■
9 × 1 ten = ■ tens	9 × 10 = ■

1. The multiplication could be written in this form too.

a

tens | ones
1 0
× 6
■ ■ ← 6 × 0 ones
↑ 6 × 1 ten

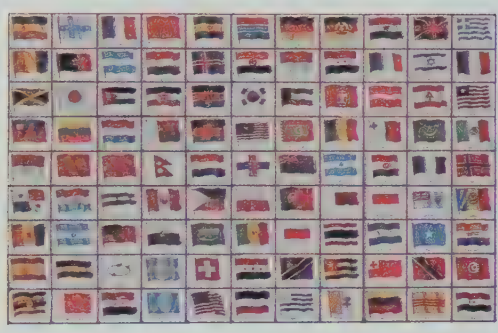
b

tens | ones
1 0
× 9
■ ■ ← 9 × 0 ones
↑ 9 × 1 ten

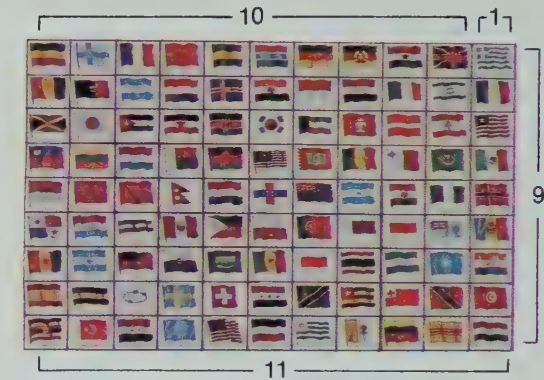
c

tens | ones
1 0
× 5
■ ■ ← 5 × 0 ones
↑ 5 × 1 ten

How many rows? How many in each row?



You can think of 11 as 10 + 1.



THINK 11 is 10 + 1
× 9
90 + 9 in all

BUT WRITE

tens	ones
1	1
×	9
9	9

9 ← 9 × 1 one

9 ← 9 × 1 ten

If your problem says 3 × 11,

THINK 11 is 10 + 1
× 3
■ + ■

BUT YOU WRITE

tens	ones
1	1
×	3
■	■

■ ← 3 × 1 one

■ ← 3 × 1 ten

1. Try these.

a

tens	ones
1	1
×	5
■	■

■ ← 5 × 1 one

■ ← 5 × 1 ten

b

tens	ones
1	1
×	4
■	■

■ ← 4 × 1 one

■ ← 4 × 1 ten

c

tens	ones
1	1
×	6
■	■

■ ← 6 × 1 one

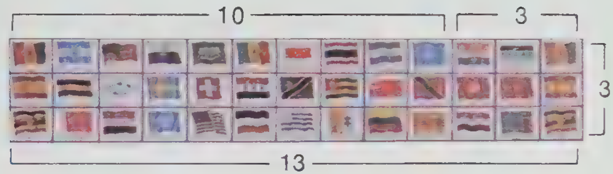
■ ← 6 × 1 ten

What would happen if there were 13 in a row?
Then how many in 3 rows?

THINK 3×3 and 3×10

WRITE

	tens	ones	
	1	3	
$\times$		3	
	■	■	← 3×3 ones
	↑		3×1 ten

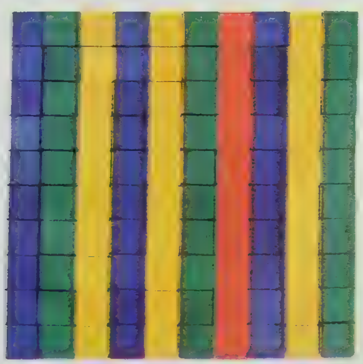


1. Try these.

a			b			c		
	tens	ones		tens	ones		tens	ones
	1	2		1	3		1	4
$\times$		3	$\times$		3	$\times$		2

d			e			f		
	tens	ones		tens	ones		tens	ones
	1	1		1	2		1	1
$\times$		7	$\times$		2	$\times$		2

2.

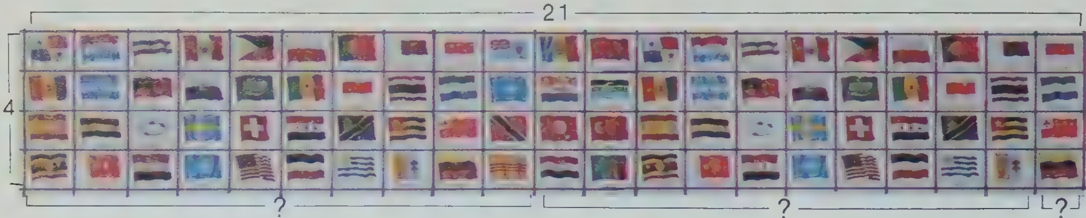


a How many rows?

b How many in each row?

c How many in all?

1. What would happen if the array had 4 rows BUT had 21 in each row?



$$\begin{array}{r} 2\,1 \\ \times \quad 4 \\ \hline \end{array}$$

← 4 × 1 one

4 × 2 tens

2. How many in 5 rows?

$$\begin{array}{r} 2\,1 \\ \times \quad 5 \\ \hline 10\,5 \end{array}$$

← 5 × 1 one

5 × 2 tens

That's interesting! 5 × 2 tens is 10 tens. 10 tens is 100!

3. **WHAT'S NEXT?**

$$\begin{array}{r} 2\,1 \\ \times \quad 6 \\ \hline 1\,2\,6 \end{array}$$

← 6 × 1 one

6 × 2 tens

Remember—that's 12 tens or 120.

What do the letters stand for?

4.
$$\begin{array}{r} 2\,1 \\ \times \quad 9 \\ \hline \end{array}$$
← 9 × 1 ones
9 × 2 tens

5.
$$\begin{array}{r} 2\,0 \\ \times \quad 7 \\ \hline \end{array}$$
← 7 × 0 ones
7 × 2 tens

6.
$$\begin{array}{r} 9\,3 \\ \times \quad 2 \\ \hline \end{array}$$
← 2 × 3 ones
2 × 9 tens

7.
$$\begin{array}{r} 3\,0 \\ \times \quad 5 \\ \hline \end{array}$$
← 5 × 0 ones
5 × 3 tens

8.
$$\begin{array}{r} 4\,3 \\ \times \quad 3 \\ \hline \end{array}$$
← 3 × 3 ones
3 × 4 tens

9.
$$\begin{array}{r} 7\,2 \\ \times \quad 4 \\ \hline \end{array}$$
← 4 × 2 ones
4 × 7 tens

10.
$$\begin{array}{r} 6\,1 \\ \times \quad 8 \\ \hline \end{array}$$
← 8 × 1 ones
8 × 6 tens

1. $\begin{array}{r} 2\ 1 \\ \times\quad 7 \\ \hline 1\ 4\ 7 \end{array}$ ← 7 × 1 one
7 × 2 tens

2. $\begin{array}{r} 3\ 2 \\ \times\quad 4 \\ \hline \square\ \square\ \square \end{array}$ ← 4 × 2 ones
4 × 3 tens

3. $\begin{array}{r} 3\ 1 \\ \times\quad 6 \\ \hline \square\ \square\ \square \end{array}$ ← 6 × 1 one
6 × 3 tens

TRY THESE.

4. $\begin{array}{r} 5\ 3 \\ \times\quad 3 \\ \hline \end{array}$ **5.** $\begin{array}{r} 4\ 0 \\ \times\quad 6 \\ \hline \end{array}$ **6.** $\begin{array}{r} 8\ 4 \\ \times\quad 2 \\ \hline \end{array}$ **7.** $\begin{array}{r} 5\ 1 \\ \times\quad 5 \\ \hline \end{array}$

8. $\begin{array}{r} 7\ 1 \\ \times\quad 6 \\ \hline \end{array}$ **9.** $\begin{array}{r} 4\ 0 \\ \times\quad 9 \\ \hline \end{array}$ **10.** $\begin{array}{r} 3\ 0 \\ \times\quad 8 \\ \hline \end{array}$ **11.** $\begin{array}{r} 4\ 2 \\ \times\quad 3 \\ \hline \end{array}$

12. $\begin{array}{r} 6\ 1 \\ \times\quad 6 \\ \hline \end{array}$ **13.** $\begin{array}{r} 7\ 3 \\ \times\quad 2 \\ \hline \end{array}$ **14.** $\begin{array}{r} 5\ 0 \\ \times\quad 7 \\ \hline \end{array}$ **15.** $\begin{array}{r} 8\ 2 \\ \times\quad 4 \\ \hline \end{array}$

Now you are really making progress.

16. $\begin{array}{r} 4\ 1 \\ \times\quad 4 \\ \hline \end{array}$ **17.** $\begin{array}{r} 7\ 3 \\ \times\quad 3 \\ \hline \end{array}$ **18.** $\begin{array}{r} 9\ 2 \\ \times\quad 3 \\ \hline \end{array}$ **19.** $\begin{array}{r} 5\ 1 \\ \times\quad 2 \\ \hline \end{array}$

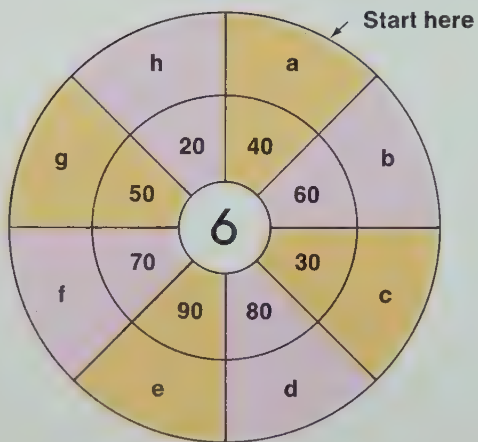
1. $\begin{array}{r} 71 \\ \times \quad 5 \\ \hline \end{array}$ 2. $\begin{array}{r} 83 \\ \times \quad 3 \\ \hline \end{array}$ 3. $\begin{array}{r} 32 \\ \times \quad 4 \\ \hline \end{array}$

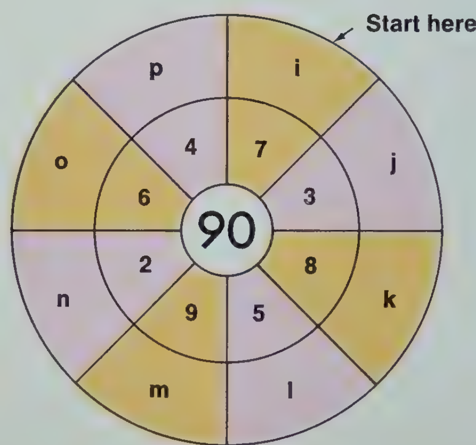
If the lines that separate the value of the numbers help you, please put them in for yourself when you do your work on your paper.

4. $\begin{array}{r} 40 \\ \times \ 8 \\ \hline \end{array}$ 5. $\begin{array}{r} 31 \\ \times \ 7 \\ \hline \end{array}$ 6. $\begin{array}{r} 72 \\ \times \ 4 \\ \hline \end{array}$ 7. $\begin{array}{r} 50 \\ \times \ 6 \\ \hline \end{array}$ 8. $\begin{array}{r} 92 \\ \times \ 3 \\ \hline \end{array}$ 9. $\begin{array}{r} 60 \\ \times \ 4 \\ \hline \end{array}$

10. $\begin{array}{r} 81 \\ \times \ 5 \\ \hline \end{array}$ 11. $\begin{array}{r} 41 \\ \times \ 6 \\ \hline \end{array}$ 12. $\begin{array}{r} 60 \\ \times \ 5 \\ \hline \end{array}$ 13. $\begin{array}{r} 51 \\ \times \ 7 \\ \hline \end{array}$ 14. $\begin{array}{r} 92 \\ \times \ 2 \\ \hline \end{array}$ 15. $\begin{array}{r} 81 \\ \times \ 6 \\ \hline \end{array}$

16. Complete the multiplication wheels.





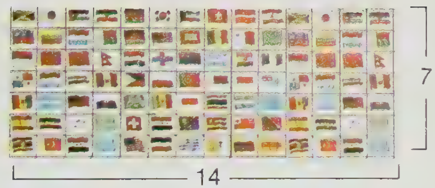
TALK ABOUT THIS PAGE

A picture sometimes helps you think through a problem.
An array really helps on this page.

Here's a special kind of problem.

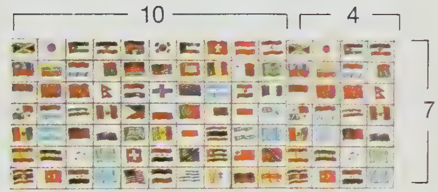
$$7 \times 14$$

And here's the array that shows it.



You know how to multiply ones.
You know how to multiply tens.
So this can't be so hard.

Think about the array this way.
It still shows 7 rows and
4 + 10 in each row.



Do you suppose we could multiply
7×4 and 7×10 and get the answer?

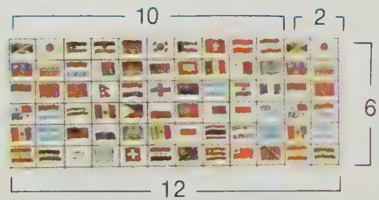
Try it!

$7 \times 14 = \underline{?}$

	tens	ones	
	1	4	Is 1 ten + 4 ones another name for 14?
×		7	
	2	8	7×4
	7	0	7×10
	■	■	Add to find how many in all.

$6 \times 12 = \underline{?}$

	tens	ones	
	1	2	
×		6	
	■	■	6×2
	■	■	6×10
	■	■	Add to find how many in all.



You can get some "thinking" help without an array, too.

THE PROBLEM $6 \times 13 = ?$

THINK

$$\begin{array}{rl} 13 \text{ is} & 10 + 3 \\ \times & 6 \\ \hline & 60 + 18 \text{ or } 78 \text{ in all} \end{array}$$

WRITE

$$\begin{array}{rl} 13 & \\ \times\ 6 & \\ \hline 18 & 6 \times 3 \\ 60 & 6 \times 10 \\ \hline 78 & \text{in all} \end{array}$$

TRY THESE

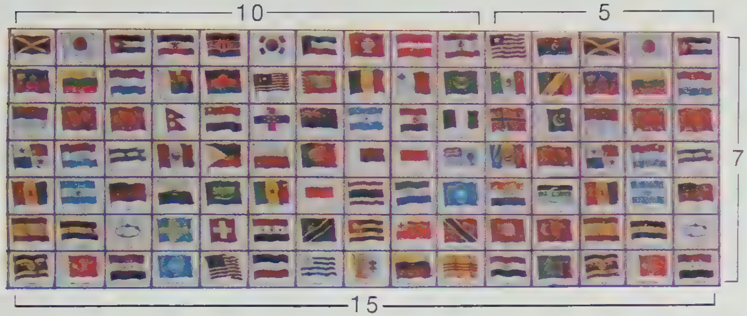
a $\begin{array}{r} 17 \\ \times\ 5 \\ \hline \end{array}$ **b** $\begin{array}{r} 16 \\ \times\ 4 \\ \hline \end{array}$ **c** $\begin{array}{r} 13 \\ \times\ 5 \\ \hline \end{array}$

d $\begin{array}{r} 12 \\ \times\ 6 \\ \hline \end{array}$ **e** $\begin{array}{r} 14 \\ \times\ 4 \\ \hline \end{array}$ **f** $\begin{array}{r} 19 \\ \times\ 5 \\ \hline \end{array}$

g $\begin{array}{r} 15 \\ \times\ 6 \\ \hline \end{array}$ **h** $\begin{array}{r} 14 \\ \times\ 3 \\ \hline \end{array}$ **i** $\begin{array}{r} 15 \\ \times\ 4 \\ \hline \end{array}$

j $\begin{array}{r} 12 \\ \times\ 5 \\ \hline \end{array}$ **k** $\begin{array}{r} 18 \\ \times\ 5 \\ \hline \end{array}$ **l** $\begin{array}{r} 16 \\ \times\ 5 \\ \hline \end{array}$

$7 \times 15 = \underline{?}$ You could use the array



You could think

$$\begin{array}{r} 10 + 5 \\ \times \quad\quad 7 \\ \hline ? + ? \end{array}$$

But you compute →

$$\begin{array}{rl} 15 & \\ \times \ \ 7 & \\ \hline 35 & 7 \times 5 \\ 70 & 7 \times 10 \\ \hline 105 & \text{in all} \end{array}$$

We need the hundreds place again!

YOUR TURN

Copy these on your paper.

1. $\begin{array}{r} 17 \\ \times \ \ 5 \\ \hline \end{array}$

2. $\begin{array}{r} 16 \\ \times \ \ 8 \\ \hline \end{array}$

3. $\begin{array}{r} 18 \\ \times \ \ 9 \\ \hline \end{array}$

4. $\begin{array}{r} 13 \\ \times \ \ 7 \\ \hline \end{array}$

5. $\begin{array}{r} 19 \\ \times \ \ 4 \\ \hline \end{array}$

6. $\begin{array}{r} 17 \\ \times \ \ 7 \\ \hline \end{array}$

7. $\begin{array}{r} 19 \\ \times \ \ 6 \\ \hline \end{array}$

8. $\begin{array}{r} 16 \\ \times \ \ 5 \\ \hline \end{array}$

9. $\begin{array}{r} 14 \\ \times \ \ 9 \\ \hline \end{array}$

Practise some more.

1.

h	t	o	
	1	9	
×		6	
	5	4	6 × 9
	6	0	6 × 10
1	1	4	in all

This next one looks different, but it is computed in the same way.

2.

h	t	o	
	2	4	
×		6	
	2	4	6 × 4
1	2	0	6 × 20
1	4	4	in all

3. 25 × 7

4. 25 × 8

5. 34 × 6

6. 37 × 4

7. 53 × 5

If the clues help, you can put them in.

8. 43 × 8

9. 45 × 5

10. 68 × 4

11. 74 × 5

12. 27 × 6

Now you're really on your own.

13. 49 × 5

14. 68 × 2

15. 27 × 4

16. 64 × 6

17. 73 × 7

18. 82 × 9

Dan worked in a candle store. Candles were the only thing they sold. But there were many different kinds. There was no adding machine. If someone bought more than one candle, Dan would have to compute the cost. Dan was smart. He knew when he was busy he didn't have time to check his arithmetic. So he decided to make charts for himself. He got them started. Put them on your paper and finish them.

Style A
55¢ each

1	2	3	4	5	6	7	8	9
55¢	$1.10	**a**	**b**	**c**	**d**	**e**	**f**	**g**

Style B
19¢ each

1	2	3	4	5	6	7	8	9
19¢	38¢	**a**	**b**	**c**	**d**	**e**	**f**	**g**

Style C
78¢ each

1	2	3	4	5	6	No one had ever bought
78¢	$1.56	**a**	**b**	**c**	**d**	more than 6.

Style D
9¢ each

1	2	3	4	5	6	7	8	9	10
9¢	18¢	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**

Dan didn't worry when someone bought the 10-cent candles.
He had a quick way to multiply. He didn't even write the problem down on paper.
He knew his answer would be right. Try to figure out his shortcut.

	a	b	c	d	e	f	g	h
1.	10×2	10×3	10×4	10×5	10×6	10×7	10×8	10×9
2.	10×10	10×11	10×12	10×13	10×14			

Have you found the shortcut yet?

If not, try some more. Change the order of factors.
Maybe the shortcut will be easier to discover.

	a	b	c	d	e	f	g	h
3.	18×10	19×10	20×10	22×10	28×10	35×10	46×10	59×10

×	10	20	30	40	50	60	70	80	90
1	10	20	30	40	50	60	70	80	90
2	20	40	60	80	10				
3	30	60	90						
4	40	80							
5	50								
6	60								
7	70								
8	80								
9	90								

What would happen if you were working
with 2 tens (20) or
3 tens (30) or
6 tens (60)?

Find out

Finish a chart like this on your paper.
It isn't hard.
It might end up looking a lot like another chart you made.

1. They rode to the airport on a shuttle bus. The bus had 10 rows of seats. There were 4 seats in each row. How many seats in all?

2. There were 5 of them. The bus fare was 20 cents. How much did they pay in all for bus fare?

3. They waited for the elevator to the observation deck. The elevator held 20 people. A lot of people waited. The elevator loaded 3 times before they got on. How many people got to the deck before they did?

4. They got to go inside a plane. They counted 20 rows of 6 seats. How many people could be seated in this plane?

5. They stopped for a milk shake. Each one of them had one. Each shake cost 30¢, including tax. How much did all of the milk shakes cost?

6. They went home on the bus. It cost 20¢ apiece again.

   a How much did each one of them spend from the time they got on the bus to go until they got home?

   b What was the total amount that all five spent?

CHECKOUT

1. Make a chart like this one and complete it.

If a box contains	2	3	4	5	6	7	8
a How many in 2 boxes?	?	?	?	?	?	?	?
b in 5 boxes?	?	?	?	?	?	?	?
c in 9 boxes?	?	?	?	?	?	?	?
d in 10 boxes?	?	?	?	?	?	?	?
e in 12 boxes?	?	?	?	?	?	?	?
f in 20 boxes?	?	?	?	?	?	?	?

2. Remember the symbols $>$, $<$, $=$?

$>$ means "is more than" $<$ means "is less than"
$=$ means "is the same as"

Tell which of the signs should be in place of the ? to make each sentence true.

a 8×12 ? 3×28 **b** 38×4 ? 8×19

c 5×42 ? 6×35 **d** 58×9 ? 9×61

e 9×89 ? 8×92 **f** 76×5 ? 8×37

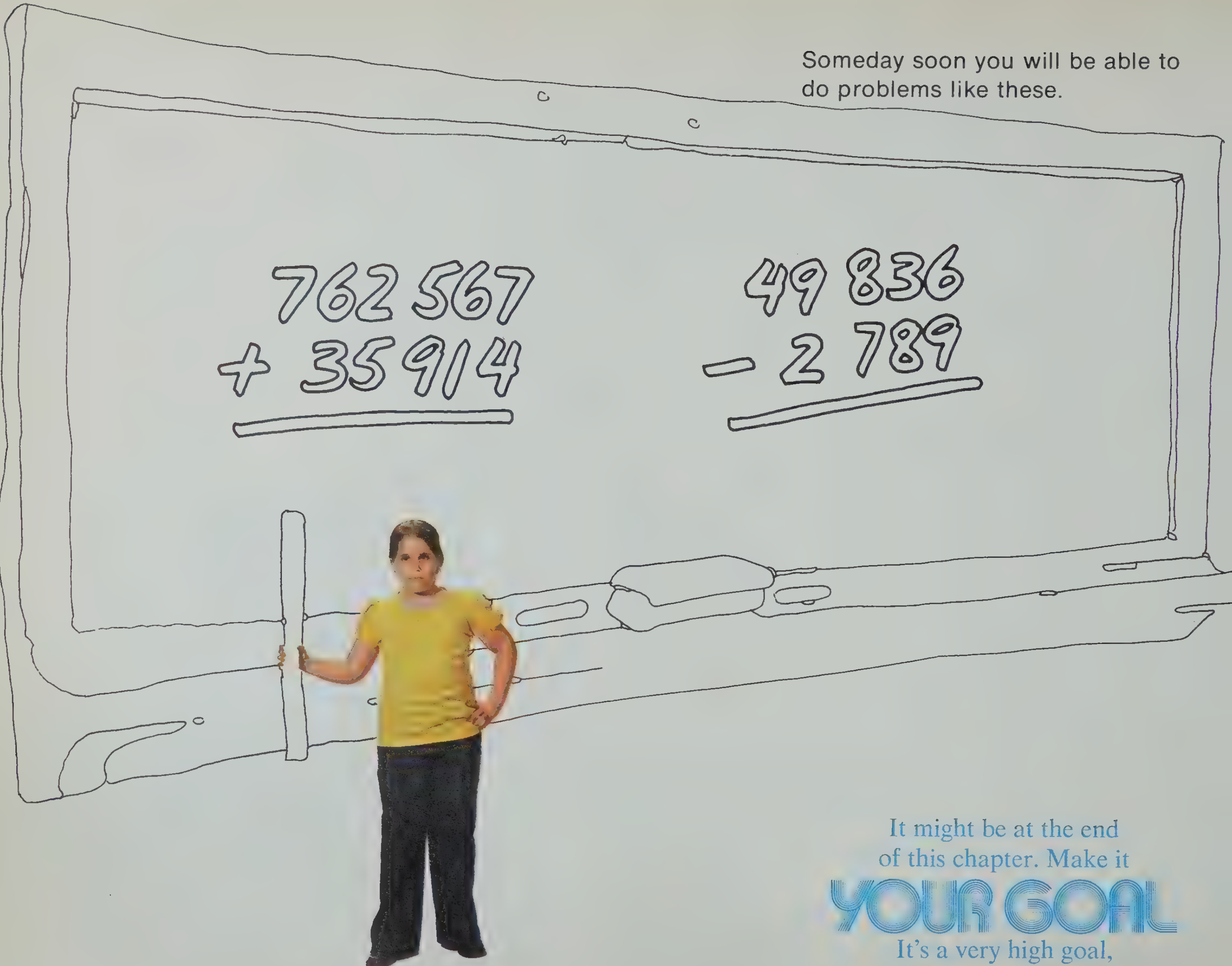
3. You have worked very hard. Did you make progress? Do these problems to prove it. You start with—

$$\begin{array}{r} 8 \\ \times\ 7 \\ \hline ? \end{array} \text{ then to } \begin{array}{r} 10 \\ \times\ 3 \\ \hline ? \end{array} \text{ then to } \begin{array}{r} 12 \\ \times\ 4 \\ \hline ? \end{array} \text{ then to } \begin{array}{r} 14 \\ \times\ 6 \\ \hline ? \end{array} \text{ then to } \begin{array}{r} 25 \\ \times\ 8 \\ \hline ? \end{array} \text{ and then } \begin{array}{r} 67 \\ \times\ 5 \\ \hline ? \end{array}$$

You have done a good job. Thank you for trying so hard.

8
ADDITION AND SUBTRACTION

Someday soon you will be able to do problems like these.



It might be at the end of this chapter. Make it

YOUR GOAL

It's a very high goal, but give it a try.

Talk about these.

1. Can you read these?

   a 534 b 6712
   c 8907 d 12 345
   e 19 678 f 981 765
   g 1 000 000 h 8 625 394

2. Which numbers above have the digit 0?
   Which numbers in the list above have the digit 1?
   Can you find a number with the digit—

   a 2? b 3?
   c 4? d 5?
   e 6? f 7?
   g 8? h 9?

Do these.

3. Can you write a number that does not have any one of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9?

4. Every whole number that we use is written with one or more of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

   a Write the smallest whole number you can think of.

   b Write the largest number you can read.

   c Do you think there are larger numbers than the one you just wrote?

   d When do people need to use large numbers?

   e Find a story in the newspaper that uses a large number.

1. See what you can do with just two digits— **0** and **1**

a	0—How many?	
b	1—How many?	
c	10—How many?	
d	100—How many?	Which Is Greatest?
e	101—How many?	
f	110—How many?	
g	111—How many?	
h	1000—How many?	Which Is Greatest?
i	1001—How many?	
j	1010—How many?	
k	1011—How many?	
l	1100—How many?	
m	1101—How many?	
n	1110—How many?	
o	1111—How many?	

2. How many more do you have if—

a I have 0 and you have 1?

b I have 1 and you have 10?

c I have 10 and you have 100?

d I have 100 and you have 101?

e I have 100 and you have 111?

f I have 100 and you have 1000?

g I have 1000 and you have 1010?

h I have 1000 and you have 1111?

A number always tells how many. The numeral you write will always use certain digits. The size of a number depends on which digits are used, how many are used, and the order of the digits used.

1. Which is greater?

a 0 or 9 b 19 or 91 c 123 or 321
d 1432 or 4132 e 91 234 or 19 234 f 100 or 1000

2. Our number system is neat. We have only the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. We can use each digit as many times as we wish. The order of the digits tells you the value of that digit.

9 means 9 ones (9×1)
90 means 9 tens (9×10)
900 means 9 hundreds (9×100)
9000 means 9 thousands (9×1000)
90 000 means 9 ten-thousands $(9 \times 10\,000)$
900 000 means 9 hundred-thousands $(9 \times 100\,000)$
9 000 000 means 9 millions $(9 \times 1\,000\,000)$

You can write even larger numbers. As large as you want! But remember—numbers mean something. They tell you "how many."

3. Follow directions. Write the numeral for each.

a The largest whole number that has only one digit

b The smallest whole number that has only one digit

c The largest whole number that uses the same digit two times

d The largest whole number that uses the same digit three times

e The largest whole number that uses the same digit four times

f The smallest whole number that uses the same digit four times

1. Look at the digit 2 in the following numbers.
   a 9872 What is the value of the digit 2 here?
   b 9827 What is the value of 2 in this number?
   c 9287 What is the value of 2 here?
   d 2987 What is the value of the digit 2 here?

2. Which is the largest number in the list above?
   How do you know it's the largest?

3. Which is the smallest number in the list?
   How do you know?

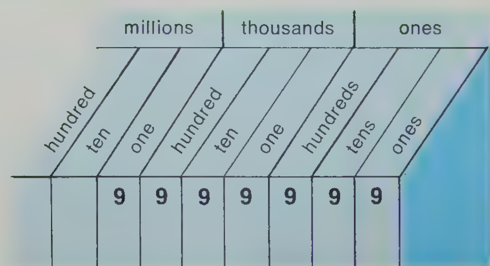
4. Use five different digits. Write the largest number you can.

5. Use six different digits. Write the largest number you can.

6. If you used only one digit seven times, the largest number you could write would be 9 999 999.

   The same digit was used, but does the digit mean the same thing?

You could put this into a chart.
The chart tells the value of each digit.
It also helps you read large numbers. How?



1. Your goal is to write the largest number you can.

Here are the rules.

You can use any of the ten digits except 9. The digit 9 has already been put into place for each number. BUT for each number you can use a digit only once.

	thousands			ones		
	hundreds	tens	ones	hundreds	tens	ones
a	9	?	?	?	?	?
b	?	9	?	?	?	?
c	?	?	9	?	?	?
d	?	?	?	9	?	?
e	?	?	?	?	9	?
f	?	?	?	?	?	9

2. Change your goal to the smallest number you can.
Use any digits of the ten digits you want, BUT use each only once.

a	?	?	?	?	?	?

b How many digits would you use to write the smallest number you know? Which digit would you use?

***c** Put these numbers in order.
Start with the largest. End with the smallest.
7201 9567 7987 9864 9091 7120

Our number system is organized. The number 1 means the same number of things to every person. Most people understand what the operations of addition and subtraction mean too. When we add two or three numbers, we get a number that is a total. This total is sometimes called the *sum.*

When we subtract one number from another, we find the number that remains. The number that remains is sometimes called the *difference.*

If directions for a set of problems say—
"Add," you know what to do.
"Find the sum," you know what to do.
"Subtract," you know what to do.
"Find the difference," you're ready to go too.
"Compute," then what do you do?

COMPUTE

	a	b	c	d	e	f
1.	8 + 7	8 − 7	9 + 6	9 − 6	7 + 3	7 − 3
2.	9 + 8	9 − 8	8 + 5	8 − 5	7 + 7	7 − 7
3.	9 + 0	9 − 0	9 + 1	9 − 1	1 + 1	1 − 1

In the next pages you will see the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 over and over and over again. Think about the digit 9.

In 9, the digit 9 signals 9 ones.
In 987, the digit 9 signals 9 hundreds.

You will add and subtract numbers—lots of them. The work won't be hard. But the work is important. You'll work with small numbers and large numbers.
Are you ready to go? Prove it.
Show that you know how to add ones.

	a	**b**	**c**	**d**	**e**
1.	$\begin{array}{r} 2 \\ +\ 6 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ +\ 2 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ +\ 3 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ +\ 3 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ +\ 7 \\ \hline \end{array}$
2.	$\begin{array}{r} 4 \\ +\ 3 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ +\ 5 \\ \hline \end{array}$	$\begin{array}{r} 1 \\ +\ 0 \\ \hline \end{array}$	$\begin{array}{r} 2 \\ +\ 5 \\ \hline \end{array}$
3.	$\begin{array}{r} 6 \\ +\ 6 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 6 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ +\ 5 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ +\ 6 \\ \hline \end{array}$
4.	$\begin{array}{r} 9 \\ +\ 5 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 8 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 7 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ +\ 6 \\ \hline \end{array}$
5.	$\begin{array}{r} 9 \\ +\ 9 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ +\ 8 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ +\ 4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ +\ 3 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ +\ 3 \\ \hline \end{array}$

Prove you know how to subtract.
Here are some easy ones.

	a	b	c	d	e	f	g
1	8 − 3	4 − 2	8 − 4	7 − 3	9 − 7	7 − 5	9 − 6
2	8 − 6	9 − 2	6 − 6	9 − 3	8 − 2	6 − 4	9 − 4
3	8 − 5	12 − 7	11 − 6	14 − 6	10 − 5	13 − 4	15 − 9
4	13 − 8	17 − 9	12 − 7	11 − 4	16 − 8	10 − 7	14 − 8
5	18 − 9	12 − 6	16 − 9	17 − 8	13 − 5	15 − 7	11 − 3

6 He had 15.
He lost 8.
How many left?

7 She made 14.
She broke 9.
How many left?

8 They bought 13.
They returned 7.
How many left?

ADD

	a	b	c	d	e	f	g
1	10 + 10	20 + 20	30 + 30	40 + 40	50 + 50	30 + 10	40 + 20
2	20 + 30	50 + 20	30 + 40	50 + 30	40 + 10	50 + 40	10 + 50
3	20 + 10	90 + 20	70 + 30	60 + 40	90 + 10	80 + 20	90 + 90
4	80 + 40	70 + 60	50 + 80	90 + 30	80 + 30	50 + 70	90 + 40
5	70 + 40	50 + 90	60 + 50	80 + 60	90 + 60	80 + 70	70 + 90
6	80 + 50	60 + 90	90 + 50	60 + 60	70 + 70	80 + 80	90 + 90

Subtract

	a	b	c	d	e	f	g
1.	20 − 10	40 − 20	60 − 30	80 − 40	100 − 50	110 − 30	110 − 50
2.	40 − 10	60 − 20	50 − 30	70 − 20	70 − 40	120 − 70	140 − 60
3.	80 − 30	50 − 10	90 − 40	60 − 50	30 − 10	130 − 40	150 − 60
4.	110 − 20	100 − 30	100 − 40	100 − 10	100 − 20	110 − 40	150 − 70
5.	180 − 90	120 − 40	130 − 60	130 − 80	120 − 30	140 − 90	160 − 90

If you can add $\begin{array}{r} 4 \\ +\ 5 \\ \hline \end{array}$ and $\begin{array}{r} 30 \\ +\ 60 \\ \hline \end{array}$ you know how to add $\begin{array}{r} 34 \\ +\ 65 \\ \hline \end{array}$

$$\begin{array}{r|l} \text{tens} & \text{ones} \\ 3 & 4 \\ +\ 6 & 5 \\ \hline 9 & 9 \end{array}$$

← Add ones first.
Then add tens.

you try this one

$$\begin{array}{r|l} \text{tens} & \text{ones} \\ 4 & 3 \\ +\ 2 & 5 \\ \hline \blacksquare & \blacksquare \end{array}$$

← Add ones first.
Then add tens.

Practise adding.

	a	b	c	d	e
	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones
1.	62 + 15	23 + 34	62 + 34	51 + 43	23 + 16
2.	65 + 23	87 + 12	34 + 23	12 + 65	45 + 22
3.	31 + 34	74 + 14	25 + 21	12 + 87	44 + 15

If you can subtract $\begin{array}{r} 9 \\ -\ 4 \\ \hline \end{array}$ and $\begin{array}{r} 50 \\ -\ 20 \\ \hline \end{array}$ you know how to subtract $\begin{array}{r} 59 \\ -\ 24 \\ \hline \end{array}$

tens | ones

$$\begin{array}{rr} & 5\ 9 \\ - & 2\ 4 \\ \hline & \blacksquare\ \blacksquare \end{array}$$

← Subtract ones first.
← Then subtract tens.

you try this one

tens | ones

$$\begin{array}{rr} & 6\ 5 \\ - & 3\ 4 \\ \hline & \blacksquare\ \blacksquare \end{array}$$

← Subtract ones first.
← Then subtract tens.

PRACTISE SUBTRACTING

	a	b	c	d	e
	tens | ones	tens | ones	tens | ones	tens | ones	tens | ones
1.	$\begin{array}{r} 4\ 9 \\ -\ 2\ 8 \\ \hline \end{array}$	$\begin{array}{r} 3\ 6 \\ -\ 1\ 6 \\ \hline \end{array}$	$\begin{array}{r} 7\ 8 \\ -\ 5\ 6 \\ \hline \end{array}$	$\begin{array}{r} 8\ 6 \\ -\ 3\ 5 \\ \hline \end{array}$	$\begin{array}{r} 9\ 8 \\ -\ 6\ 7 \\ \hline \end{array}$
2.	$\begin{array}{r} 4\ 1 \\ -\ 3\ 0 \\ \hline \end{array}$	$\begin{array}{r} 7\ 9 \\ -\ 4\ 9 \\ \hline \end{array}$	$\begin{array}{r} 5\ 7 \\ -\ 2\ 1 \\ \hline \end{array}$	$\begin{array}{r} 9\ 3 \\ -\ 5\ 2 \\ \hline \end{array}$	$\begin{array}{r} 9\ 6 \\ -\ 7\ 1 \\ \hline \end{array}$
3.	$\begin{array}{r} 6\ 4 \\ -\ 4\ 3 \\ \hline \end{array}$	$\begin{array}{r} 8\ 5 \\ -\ 4\ 4 \\ \hline \end{array}$	$\begin{array}{r} 7\ 4 \\ -\ 3\ 1 \\ \hline \end{array}$	$\begin{array}{r} 6\ 7 \\ -\ 2\ 6 \\ \hline \end{array}$	$\begin{array}{r} 9\ 8 \\ -\ 4\ 2 \\ \hline \end{array}$

If you can add $\begin{array}{r} 4 \\ +\ 7 \\ \hline \end{array}$ and $\begin{array}{r} 50 \\ +\ 30 \\ \hline \end{array}$ you can add $\begin{array}{r} 54 \\ +\ 37 \\ \hline \end{array}$

$$\begin{array}{r} 5\ 4 \\ +\ 3\ 7 \\ \hline 1\ 1 \\ 8\ \\ \hline 9\ 1 \end{array}$$

Add ones first.
Then add tens.
in all

you try this one

$$\begin{array}{r} 6\ 3 \\ +\ 2\ 8 \\ \hline \blacksquare\ \blacksquare \\ \blacksquare\ \\ \hline \blacksquare\ \blacksquare \end{array}$$

Add ones first.
Then add tens.
in all

Practise

	a	b	c	d	e
1.	$\begin{array}{r} 52 \\ +\ 29 \\ \hline \end{array}$	$\begin{array}{r} 44 \\ +\ 38 \\ \hline \end{array}$	$\begin{array}{r} 63 \\ +\ 27 \\ \hline \end{array}$	$\begin{array}{r} 65 \\ +\ 19 \\ \hline \end{array}$	$\begin{array}{r} 74 \\ +\ 16 \\ \hline \end{array}$
2.	$\begin{array}{r} 45 \\ +\ 27 \\ \hline \end{array}$	$\begin{array}{r} 36 \\ +\ 25 \\ \hline \end{array}$	$\begin{array}{r} 73 \\ +\ 29 \\ \hline \end{array}$	$\begin{array}{r} 44 \\ +\ 49 \\ \hline \end{array}$	$\begin{array}{r} 57 \\ +\ 34 \\ \hline \end{array}$

3. Everyone was collecting cans to be recycled.
Here is a chart of how many cans were collected each day for five days.
Figure out how many were collected each day.

Cans collected	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	53	26	45	38	59
Afternoon	18	39	47	44	32

It's silly to use up extra space if you don't need to, when you are adding numbers that need to be renamed.

Review the two ways of writing problems.

Here's one way.

tens	ones
4	7
+ 2	8
1	5
6	
7	5

Here's another way.

tens	ones
1	
4	7
+ 2	8
7	5

These are the same problem.
They have the same answer.
You decide which way is better for **you.**

Copy and add these. Write the computation your way.

	a	b	c	d	e	f	g
1.	59 + 19	28 + 58	37 + 47	25 + 18	16 + 37	67 + 14	49 + 23
2.	37 + 13	17 + 78	25 + 66	38 + 56	26 + 29	67 + 19	54 + 29
3.	35 + 37	26 + 36	38 + 15	49 + 12	26 + 48	48 + 39	56 + 35

Sometimes you must rename in subtraction, too.

tens	ones	
2	14	Rename first.
3	4	
− 1	9	
1	5	← Then subtract ones.
↑		Then the tens.

you try this one

tens	ones	
4	11	Rename first.
5	1	
− 1	7	
■	■	← Then subtract ones.
↑		Then tens.

Copy and subtract. Renaming is needed in every problem.

	a	b	c	d	e	f	g
1.	42 − 16	63 − 17	75 − 19	50 − 23	34 − 16	86 − 27	47 − 19
2.	86 − 39	72 − 47	45 − 26 1	98 − 79	83 − 45	77 − 58	65 − 48
3.	62 − 34	33 − 29	92 − 15	53 − 46	44 − 39	76 − 48	81 − 67

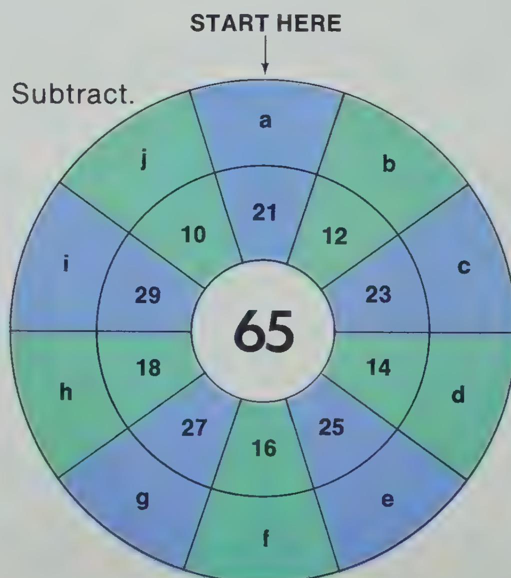
The boys said they could sell more apples than the girls. The girls knew better. The apple sale went on for one week. Here is their record for the week.

Apples	Monday	Tuesday	Wednesday	Thursday	Friday
Boys	97	74	96	85	93
Girls	92	86	96	96	75

1. Who sold the most apples each day? How many more?
2. How many apples in all did the boys sell that week?
3. How many apples in all did the girls sell that week?
4. Did the boys or the girls sell more apples?

5. Add.

6. Subtract.



If you can add $\begin{array}{r} 2 \\ +\ 6 \\ \hline \end{array}$ and $\begin{array}{r} 30 \\ +\ 90 \\ \hline \end{array}$ you can add $\begin{array}{r} 32 \\ +\ 96 \\ \hline \end{array}$.

$$\begin{array}{rrrl} & 3 & 7 & \\ + & & 9\ \ 6 & \\ \hline & & 1\ \ 3 & \text{Add ones.} \\ 1 & 2 & & \text{Add tens.} \\ \hline 1 & 3 & 3 & \text{in all} \end{array}$$

Some can be written all on one line.

$$\begin{array}{rrrl} & 6 & 1 & \\ + & 4 & 5 & \\ \hline 1 & 0 & 6 & \leftarrow \text{Add ones.} \\ & \uparrow & & \text{Add tens.} \end{array}$$

Practise

	a	b	c	d	e
1.	73 + 45	83 + 46	96 + 63	75 + 64	82 + 90
2.	92 + 77	83 + 74	92 + 54	93 + 46	83 + 31

The bakery is a great place to go. The baker makes so many things.

3. One day he made 96 loaves of white bread and 84 loaves of dark bread. How many loaves did he make?

4. He made 96 chocolate and 48 white cakes. How many cakes?

5. He made 36 pans of pecan rolls and 72 pans of Danish rolls. How many pans of rolls did he make?

6. You tell how many cookies he might have made that day.

Some digits turned up in the hundreds place in the last page with addition. Switch to subtraction. Try these. Sometimes you have to rename. Sometimes you don't.

Here you do.

	hundreds	tens	ones
		4	14
	1	~~5~~	~~4~~
−		3	6
	1	1	8

First subtract ones.
Then subtract tens.
Then subtract hundreds.

Here you don't.

	hundreds	tens	ones
	2	6	9
−		2	5
	2	4	4

1
2
3

Copy and subtract.

	a	b	c	d	e
	h t o	h t o	h t o	h t o	h t o
1.	341 − 36	256 − 48	199 − 29	148 − 16	267 − 49
2.	379 − 62	293 − 38	471 − 62	576 − 75	481 − 29
3.	116 − 13	260 − 57	391 − 43	134 − 15	199 − 31

If you can add $\begin{array}{r} 3 \\ +\ 4 \\ \hline \end{array}$ and $\begin{array}{r} 50 \\ +\ 20 \\ \hline \end{array}$ and $\begin{array}{r} 600 \\ +\ 100 \\ \hline \end{array}$ you can add $\begin{array}{r} 653 \\ +\ 124 \\ \hline \end{array}$

hundreds	tens	ones	
6	5	3	
+ 1	2	4	
?	7	7	← Add ones first.

Then add tens.

Then add hundreds.

you try this one

hundreds	tens	ones	
5	4	6	
+ 4	2	3	
■	■	■	← Add ones.

Add tens.

Add hundreds.

What would happen in a problem like this?

hundreds	tens	ones	
2	7	3	
+	8	1	
■	■	■	← Add ones. Any tens to rename?

Add tens. Any hundreds to rename? You know what to do.

Add hundreds and you have found the sum.

Practise on these.

	a	b	c	d	e
1.	$\begin{array}{r} 785 \\ +\ 73 \\ \hline \end{array}$	$\begin{array}{r} 214 \\ +\ 95 \\ \hline \end{array}$	$\begin{array}{r} 367 \\ +\ 82 \\ \hline \end{array}$	$\begin{array}{r} 479 \\ +\ 30 \\ \hline \end{array}$	$\begin{array}{r} {}^{1}\ \ \\ 69 \\ +\ 23 \\ \hline \end{array}$
2.	$\begin{array}{r} 652 \\ +\ 161 \\ \hline \end{array}$	$\begin{array}{r} 477 \\ +\ 232 \\ \hline \end{array}$	$\begin{array}{r} 598 \\ +\ 190 \\ \hline \end{array}$	$\begin{array}{r} 151 \\ +\ 155 \\ \hline \end{array}$	$\begin{array}{r} 197 \\ +\ 280 \\ \hline \end{array}$

You are getting good in addition.

$$\begin{array}{r} 1\ 3\ 4 \\ +\ \ \ 5\ 7 \\ \hline ?\ ?\ ? \end{array}$$

Is there anything hard about this problem?
Compute the sum.
What do you do first? Then what? Anything more?

You shouldn't have any trouble with these either.
Copy and then add.

	a	b	c	d	e
1	$\begin{array}{r} 237 \\ +129 \\ \hline \end{array}$	$\begin{array}{r} 389 \\ +315 \\ \hline \end{array}$	$\begin{array}{r} 478 \\ +109 \\ \hline \end{array}$	$\begin{array}{r} 138 \\ +175 \\ \hline \end{array}$	$\begin{array}{r} 169 \\ +561 \\ \hline \end{array}$

All you have to do is take one step at a time.
First add the ones, then add the tens, and *finally*
add the hundreds. Show that you know how. Add these.

	a	b	c	d	e
2	$\begin{array}{r} 567 \\ +151 \\ \hline \end{array}$	$\begin{array}{r} 453 \\ +474 \\ \hline \end{array}$	$\begin{array}{r} 182 \\ +382 \\ \hline \end{array}$	$\begin{array}{r} 275 \\ +369 \\ \hline \end{array}$	$\begin{array}{r} 346 \\ +507 \\ \hline \end{array}$
3	$\begin{array}{r} 368 \\ +194 \\ \hline \end{array}$	$\begin{array}{r} 176 \\ +444 \\ \hline \end{array}$	$\begin{array}{r} 998 \\ +164 \\ \hline \end{array}$	$\begin{array}{r} 446 \\ +375 \\ \hline \end{array}$	$\begin{array}{r} 139 \\ +283 \\ \hline \end{array}$

hundreds	tens	ones
9	6	2
+ 3	6	8
■	■	■

← Add ones. Any tens to rename?
Then add tens. Any hundreds? Put them in the right place.
Add hundreds. Any thousands? Any problems?

You can add just about any two whole numbers

Small ones or large ones should cause you no trouble. Take one step at a time. Add ones first. Rename if necessary. Then add tens. Rename if necessary. And just keep going until you have finished.

Practise

	a	b	c	d	e
1	969 + 470	738 + 563	841 + 506	487 + 829	646 + 954
2	731 + 777	930 + 885	833 + 409	364 + 888	948 + 270
3	986 + 760	465 + 698	944 + 279	746 + 805	594 + 986

Look for mistakes on this page.

Is there something wrong in this problem?

hundreds	tens	ones
5	7	4
+ 1	9	8
7	7	2

Is there something wrong in this problem?

hundreds	tens	ones
6	8	5
+ 1	7	6
8	5	1

Find the problems with the wrong answer.
Make the answer correct.

	a	b	c	d
1.	125 + 879 = 1004	504 + 168 = 672	522 + 69 = 581	979 + 679 = 1658
2.	578 + 859 = 1337	586 + 568 = 1144	478 + 965 = 1443	967 + 868 = 1836
3.	549 + 987 = 1536	856 + 879 = 1725	596 + 657 = 1153	476 + 995 = 1471

Thousands should have a place to call its own.
It is a big word. A chart would look like this:

Thousands	hundreds	tens	ones

THAT TAKES TOO MUCH SPACE!

Use a capital T to stand for thousands.

$$\begin{array}{rcccc} & T & h & t & o \\ & & 7 & 3 & 5 \\ + & & 5 & 6 & 4 \\ \hline & 1 & 2 & 9 & 9 \end{array}$$

WHY NOT GO ALL THE WAY?

Try adding thousands too. Look at these examples.

A
$$\begin{array}{rcccc} & T & h & t & o \\ & 4 & 0 & 0 & 0 \\ + & 5 & 0 & 0 & 0 \\ \hline & 9 & 0 & 0 & 0 \end{array}$$

B
$$\begin{array}{rcccc} & T & h & t & o \\ & 3 & 0 & 0 & 2 \\ + & 2 & 0 & 0 & 5 \\ \hline & 5 & 0 & 0 & 7 \end{array}$$

C
$$\begin{array}{rcccc} & T & h & t & o \\ & 2 & 0 & 1 & 3 \\ + & 4 & 0 & 8 & 6 \\ \hline & 6 & 0 & 9 & 9 \end{array}$$

D
$$\begin{array}{rcccc} & T & h & t & o \\ & 2 & 5 & 6 & 3 \\ + & 1 & 3 & 1 & 1 \\ \hline & 3 & 8 & 7 & 4 \end{array}$$

E
$$\begin{array}{rcccc} & T & h & t & o \\ & 5 & 9 & 0 & 4 \\ + & 2 & 0 & 7 & 3 \\ \hline & 7 & 9 & 7 & 7 \end{array}$$

That doesn't look so hard. Try some. Find out for yourself.

1.

a $\begin{array}{rcccc} & 1 & 0 & 0 & 6 \\ + & 1 & 0 & 0 & 3 \\ \hline \end{array}$

b $\begin{array}{rcccc} & 8 & 0 & 1 & 5 \\ + & 1 & 0 & 8 & 4 \\ \hline \end{array}$

c $\begin{array}{rcccc} & 2 & 1 & 6 & 1 \\ + & 5 & 1 & 0 & 2 \\ \hline \end{array}$

d $\begin{array}{rcccc} & 2 & 1 & 1 & 2 \\ + & 3 & 8 & 5 & 7 \\ \hline \end{array}$

e $\begin{array}{rcccc} & 3 & 4 & 7 & 6 \\ + & 2 & 5 & 1 & 2 \\ \hline \end{array}$

The next ones have some renaming. But there are no new rules.

2.

$\begin{array}{rcccc} & 1 & 8 & 2 & 5 \\ + & 2 & 1 & 6 & 9 \\ \hline \end{array}$

$\begin{array}{rcccc} & 2 & 0 & 2 & 9 \\ + & 4 & 1 & 1 & 4 \\ \hline \end{array}$

$\begin{array}{rcccc} & 1 & 1 & 2 & 5 \\ + & 4 & 6 & 0 & 8 \\ \hline \end{array}$

$\begin{array}{rcccc} & 1 & 3 & 0 & 9 \\ + & 7 & 0 & 6 & 7 \\ \hline \end{array}$

$\begin{array}{rcccc} & 4 & 7 & 3 & 8 \\ + & 1 & 2 & 5 & 6 \\ \hline \end{array}$

You can probably subtract large numbers, too.
Take just one step at a time. Rename when necessary.

	hundreds	tens	ones
	6	7	8
−	3	2	4
	■	■	■

	hundreds	tens	ones
	5	6	2
−	3	1	5
	■	■	■

	hundreds	tens	ones
	4	5	9
−	2	7	3
	■	■	■

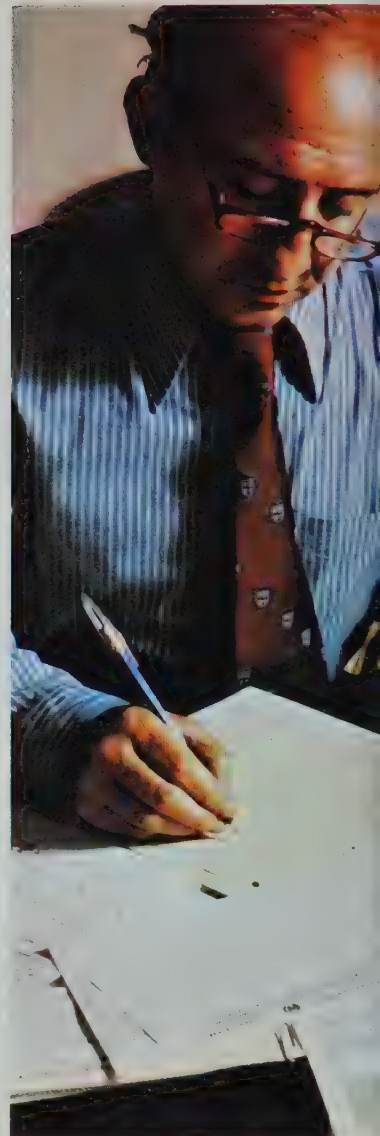
Are you ready for a very, very hard one?

	hundreds	tens	ones
	3	4	6
−	1	7	9
	■	■	■

First the ones. Do you have to rename? **Do it!**
Now the tens. Do you have to rename? **Do it!**
Now the hundreds. Any trouble?

Subtract. Don't panic. Take one step at a time.

	a	b	c	d	e
1.	587 − 279	722 − 278	553 − 186	947 − 458	756 − 357
2.	331 − 254	928 − 129	631 − 138	920 − 256	810 − 521



Some people like to make sure their answers are correct.
There is a way to check subtraction problems.

$$\begin{array}{r} 14 \\ -\ \ 9 \\ \hline 5 \end{array} \quad \text{Correct?} \quad \text{Check} \quad \begin{array}{r} 5 \\ +\ 9 \\ \hline 14 \end{array}$$

You subtracted 9, so when you check you put it back. Is the answer correct?

$$\begin{array}{r} 93 \\ -\ 17 \\ \hline 75 \end{array} \quad \text{Correct?} \quad \text{Check} \quad \begin{array}{r} 75 \\ +\ 17 \\ \hline 82 \end{array}$$

SOMETHING IS WRONG?
Where is the error?

$$\begin{array}{r} 125 \\ -\ \ 96 \\ \hline 29 \end{array} \quad \text{Correct?} \quad \text{Check} \quad \begin{array}{r} 29 \\ +\ 96 \\ \hline 126 \end{array}$$

WHAT'S WRONG NOW?
Where is the error?

Check these subtraction problems on your paper.
Correct the error if there is one.

1. $\begin{array}{r} 435 \\ -\ 167 \\ \hline 268 \end{array}$ Check

2. $\begin{array}{r} 945 \\ -\ 196 \\ \hline 849 \\ 749 \end{array}$ Check

3. $\begin{array}{r} 922 \\ -\ 138 \\ \hline 784 \end{array}$ Check

4. $\begin{array}{r} 810 \\ -\ 236 \\ \hline 574 \end{array}$ Check

Does a check guarantee your answer is correct?

The digit 0 can be a troublemaker if you let it.

$$\begin{array}{r} 5 \\ +\ 0 \\ \hline ? \end{array} \qquad \begin{array}{r} 5 \\ -\ 0 \\ \hline ? \end{array} \qquad \begin{array}{r} 0 \\ +\ 5 \\ \hline ? \end{array} \qquad \cancel{\begin{array}{r} 0 \\ -\ 5 \\ \hline \end{array}}$$

That's a silly problem. There is no whole-number answer.

1. Don't let 0 fool you in addition. Prove that you know how to compute with oodles of zeros.

a	b	c	d	e
$\begin{array}{r} 60 \\ +\ 40 \\ \hline \end{array}$	$\begin{array}{r} 500 \\ +\ 200 \\ \hline \end{array}$	$\begin{array}{r} 700 \\ +\ 300 \\ \hline \end{array}$	$\begin{array}{r} 1001 \\ +\ 2010 \\ \hline \end{array}$	$\begin{array}{r} 90\ 000 \\ +\ 10\ 000 \\ \hline \end{array}$

WOW!

2. There are many ways to be master over 0 in subtraction. Look at one problem computed in two ways. Take your pick. There may be a way that you like even better.

$$\begin{array}{r} {\scriptstyle 9} \\ {\scriptstyle 4\ \cancel{10}\ 10} \\ \cancel{5}\cancel{0}\cancel{0} \\ -\ 149 \\ \hline \end{array}$$

THINK

I must rename to have 10 ones.
But there are 0 tens. So I rename
5 hundreds to get the 10 tens.
Now I can rename a ten.
And I'm ready to subtract!

OR you could think about
renaming 50 tens to 49 tens so
you can be ready to subtract.
The results are the same.

$$\begin{array}{r} {\scriptstyle 4\ 9\ 10} \\ \cancel{50}\cancel{0} \\ -\ 149 \\ \hline \end{array}$$

Pick the way that's best for you.
Practise on these subtraction problems.
Check your answers.

These are harder. Try them.

	a	b	c	d	e
3.	$\begin{array}{r} 200 \\ -\ \ 51 \\ \hline \end{array}$	$\begin{array}{r} 400 \\ -\ 286 \\ \hline \end{array}$	$\begin{array}{r} 700 \\ -\ 574 \\ \hline \end{array}$	$\begin{array}{r} 2000 \\ -\ 1639 \\ \hline \end{array}$	$\begin{array}{r} 3500 \\ -\ 2478 \\ \hline \end{array}$

1. Subtract 123 from each of these numbers.

   a 123 **b** 132 **c** 213 **d** 231 **e** 312 **f** 321

2. Subtract 456 from each of these numbers.

   a 456 **b** 465 **c** 546 **d** 564 **e** 645 **f** 654

3. Subtract 111 from each of these numbers.

   a 200 **b** 201 **c** 210 **d** 211 **e** 221 **f** 222

4. Arrange each set of three numbers so that you have a correct addition problem. Rearrange the same three numbers so that you have a correct subtraction problem.

   a 123, 456, 579 **b** 627, 258, 369

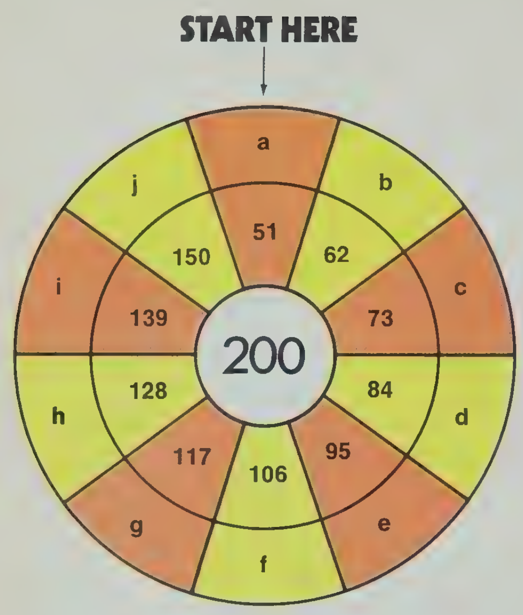
   c 147, 936, 789 **d** 975, 654, 321

   e 1308, 951, 357 **f** 239, 985, 1224

5. What is the largest number you can add to or subtract from 585 and get an answer of 585?

6. Find two addition problems that each have a sum of 111.
   Now find two subtraction problems that each have a difference of 111.
   Are any numbers the same except the number 111 in your four problems?
   Can you find more problems that have an answer 111? Try it.

1. Subtract.



2. Add.

a 149 + 51 = ?

b 138 + 62 = ?

c 127 + 73 = ?

d 116 + 84 = ?

e 105 + 95 = ?

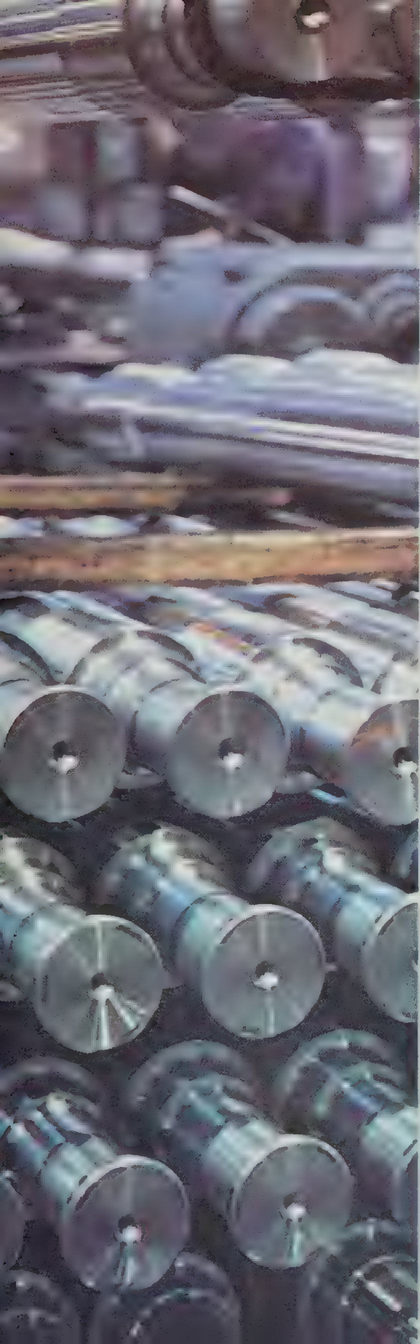
f 94 + 106 = ?

Something funny?

Where did these addition problems come from?

Compute. Watch out! There are both addition and subtraction.

	a	b	c	d	e	f
3.	347 + 273	422 + 316	29 − 11	708 + 49	596 − 485	914 + 86
4.	370 + 158	293 − 127	937 − 768	351 + 26	456 + 654	679 − 669
5.	868 − 379	379 + 588	667 − 378	620 − 155	673 + 127	2540 − 1539



Mr. Travis worked in a manufacturing plant. His job was to make sure machine parts were O.K. He had to make out a weekly report. He told how many parts had been made and how many parts were not good enough to send out. The bad parts were called rejects. Here is his report.

Pieces made	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
First shift	596	564	530	585	497
Second shift	432	323	469	404	512
Pieces rejected					
First shift	51	46	30	49	9
Second shift	25	20	28	10	10

1. How many pieces were made each day of the week?
2. What was the total number of pieces made that week?
3. How many pieces were rejected each day of the week?
4. What was the total number of pieces rejected that week?
5. How many pieces were O.K. to send out each day?
6. What was the total number of pieces O.K. to send out that week?
7. Which was the "best" day of the week for manufacturing parts? How did you decide what made the best day of the week?

Fred still forgets more than he remembers. One day he forgot how to add *and* he forgot how to subtract. Here is his paper. He made so many mistakes. Find his mistakes. Work the problem right. Be ready to explain to Fred what he forgot.

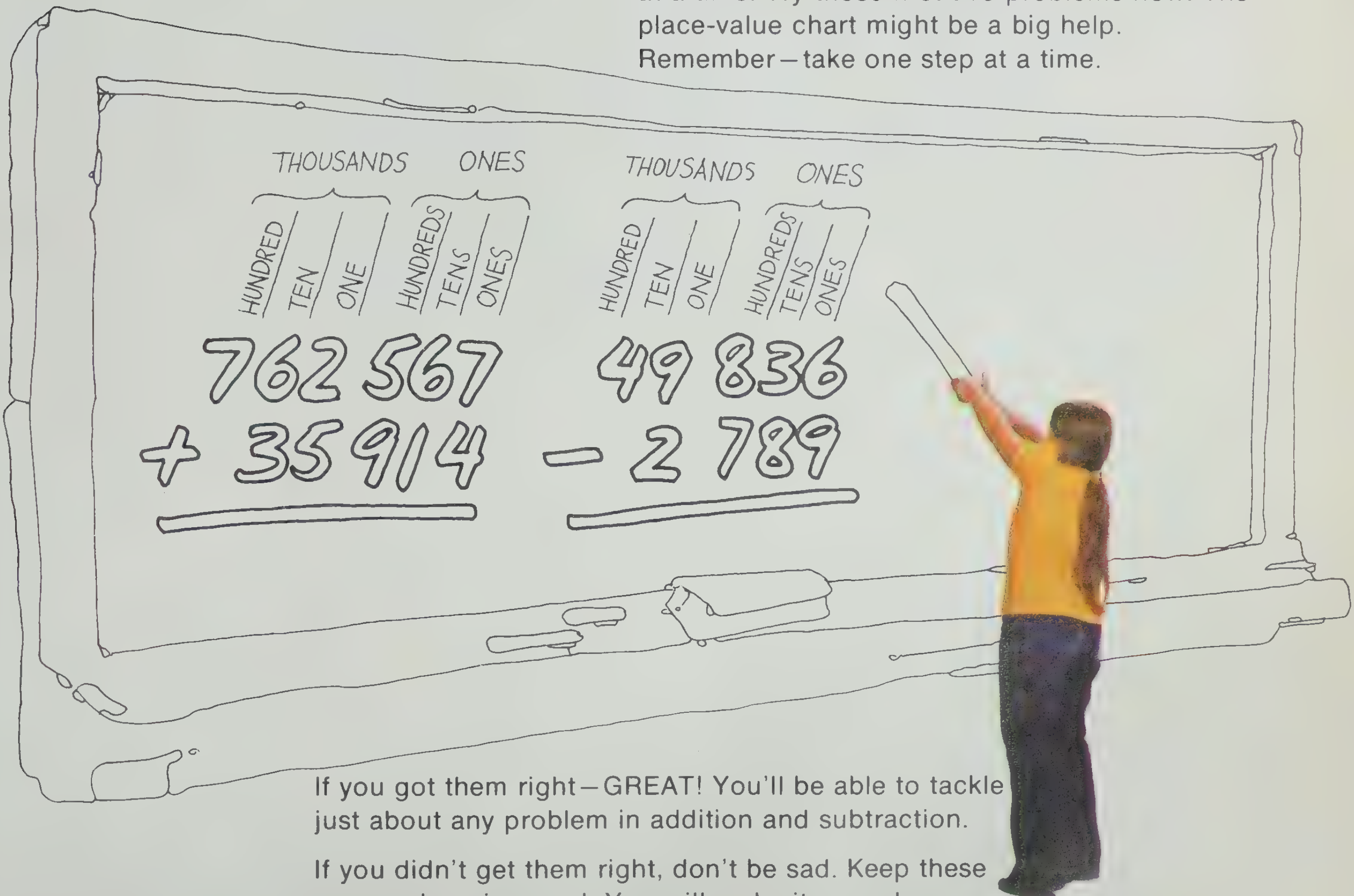
1. 75 + 16 81	**2.** 1 1 275 + 59 234	**3.** 367 + 136 493	**4.** 32 − 16 24
5. 351 − 75 324	**6.** 3 1 450 − 196 266	**7.** 3 14 12 342 − 156 296	**8.** 7 5 876 + 159 1611

*And poor Fred! What did he do wrong in this addition?

You do these. Don't make mistakes as Fred did. Be careful. Watch the signs.

	a	b	c	d	e
9.	491 − 365	655 − 378	979 + 509	636 + 694	530 − 296
10.	571 − 278	927 + 385	861 − 627	709 − 248	439 + 483

Remember the two problems on the first page of this chapter? They were to be your goal. You have been adding and subtracting all sizes of numbers. No matter how large the number, you took just one step at a time. Try those first two problems now. The place-value chart might be a big help. Remember – take one step at a time.



If you got them right – GREAT! You'll be able to tackle just about any problem in addition and subtraction.

If you didn't get them right, don't be sad. Keep these as your learning goal. You will make it someday soon.

CHECKOUT

1. Look at the number 6425.

   a What is the value of the digit 2?

   b What is the value of the digit 4?

   c What is the value of the digit 6?

   d Is the 6425 the largest number that can be written with these four digits?

2. Write the largest number in each set of numbers.

   a 234, 432 **b** 802, 801

   c 3786, 3876 **d** 300, 200, 100

   e 64, 71, 59 **f** 240, 420, 402

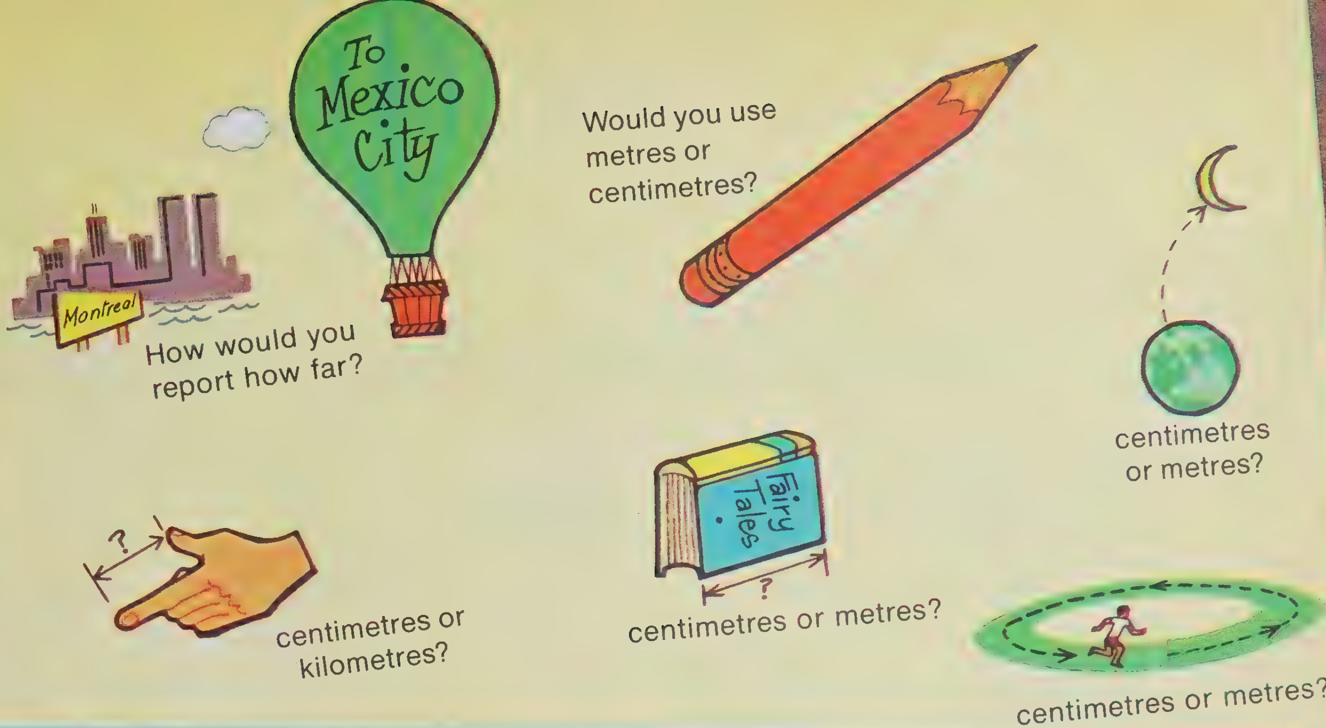
3. Compute. Watch out! Look at the signs.

a $\begin{array}{r} 251 \\ +\ 428 \\ \hline \end{array}$ **b** $\begin{array}{r} 879 \\ -\ 426 \\ \hline \end{array}$ **c** $\begin{array}{r} 627 \\ +\ 138 \\ \hline \end{array}$ **d** $\begin{array}{r} 785 \\ -\ 269 \\ \hline \end{array}$

e $\begin{array}{r} 930 \\ -\ 213 \\ \hline \end{array}$ **f** $\begin{array}{r} 3605 \\ +\ 1287 \\ \hline \end{array}$ **g** $\begin{array}{r} 816 \\ -\ 568 \\ \hline \end{array}$ **h** $\begin{array}{r} 1564 \\ +\ 1289 \\ \hline \end{array}$

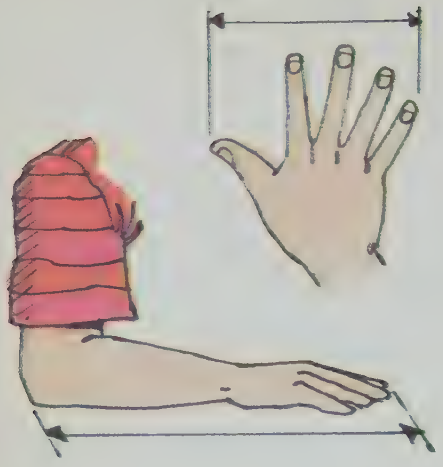
9 MEASUREMENT LENGTH

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
people who measure—
20 30 40
mm



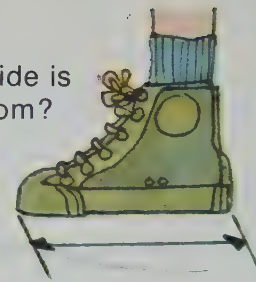
People in most countries use the metric system of measure. In some countries people are changing to the metric system.

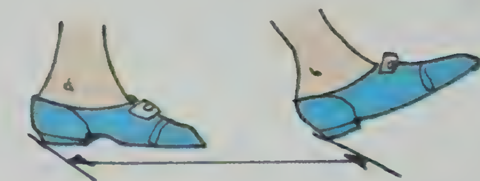
YOUR GOAL is to find out more about the metric system of measure.



1. How many wide is your open book?

2. How many wide is your classroom?





3. How many wide is the chalkboard?

4. How many long is the hallway?

This is how people measured things long ago.

5. Use your hands as a unit of measure.
   - a What is the width of your desk?
   - b Are your friends' desks the same size?
     What measurements do your friends get?
     Were they the same?
   - c Why are the measurements different?

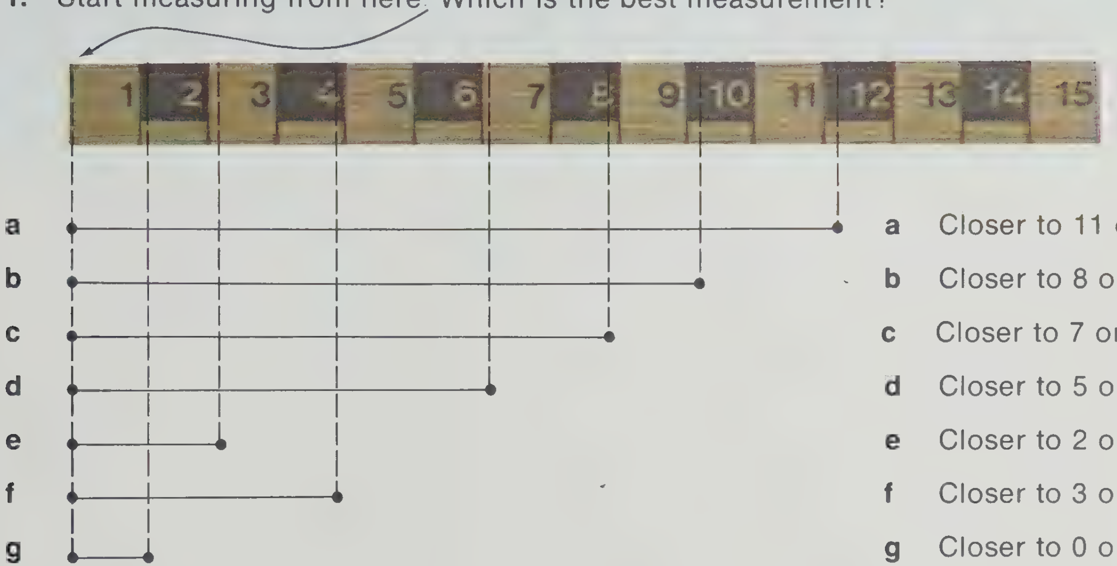
6. Is the width of every person's hand always the same?

   Compare Find out.

   Would a measuring stick marked with the same-size units help?
   Would the measurements of the desks
   be the same if you used the same measuring stick?

Some measuring sticks are called rulers.
One is drawn on this page.
It is marked with a unit of measure called a centimetre.

1. Start measuring from here. Which is the best measurement?



- **a** Closer to 11 or 12?
- **b** Closer to 8 or 9 or 10?
- **c** Closer to 7 or 8?
- **d** Closer to 5 or 6?
- **e** Closer to 2 or 3?
- **f** Closer to 3 or 4 or 5?
- **g** Closer to 0 or 1 or 2?

2. Could you use a ruler like the one above to measure your height?

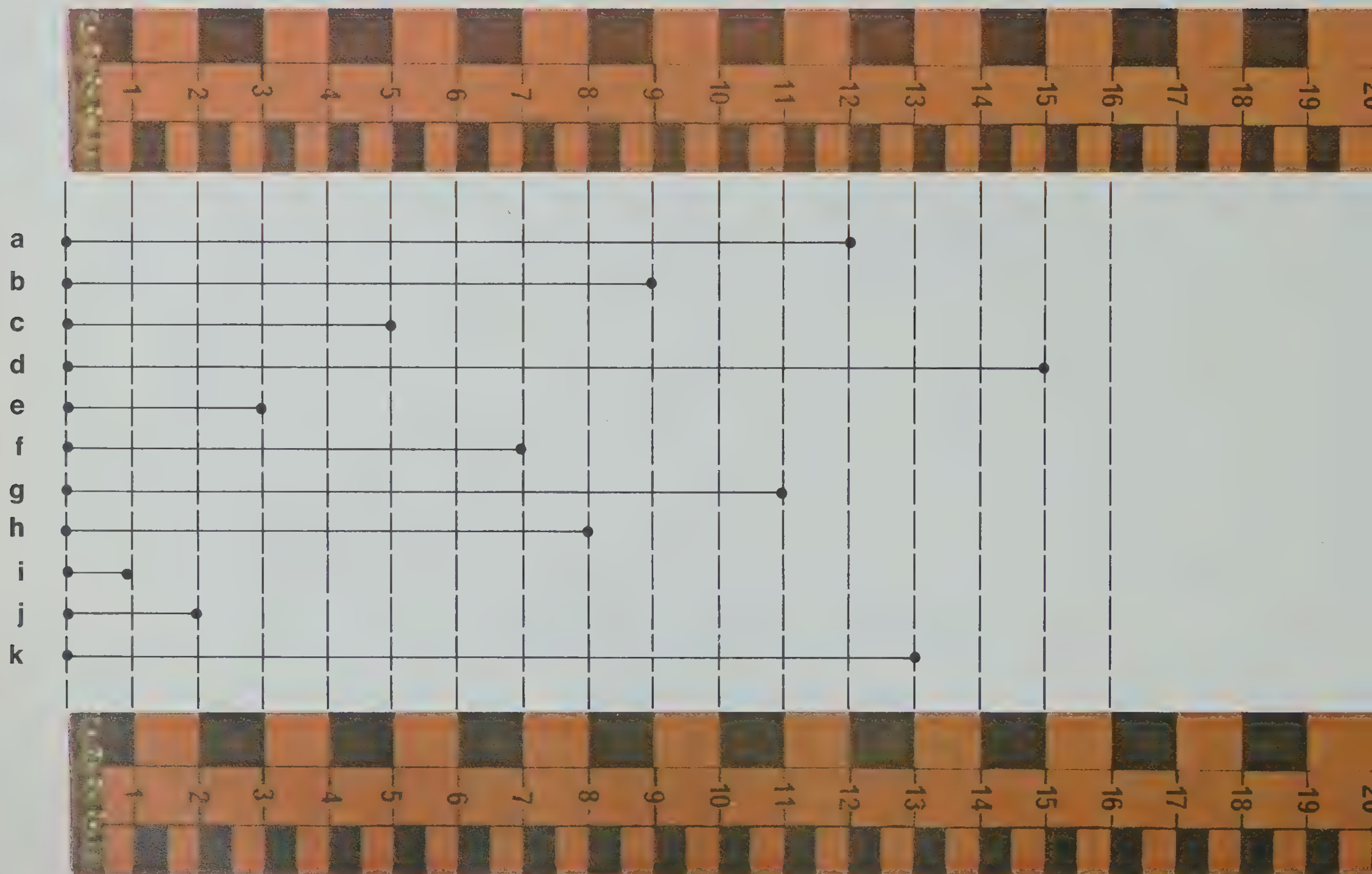
3. If you wanted a longer ruler, could you make a centimetre ruler 30 centimetres long? Could you make one 50 centimetres long? Could you make one 100 centimetres long?

4. A centimetre is called a standard unit of length. What could the word *standard* mean?

5. What things might you measure using a centimetre ruler?

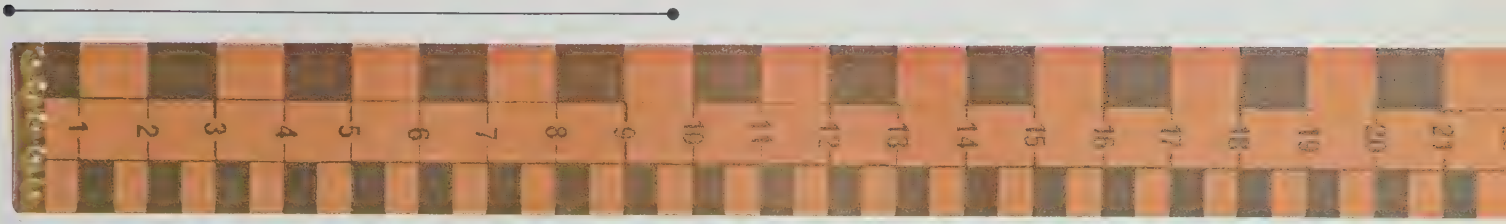
Many people use cm to stand for the word centimetre.
You will see both used on the next pages.

Centimetres are pictured on the two rulers below.



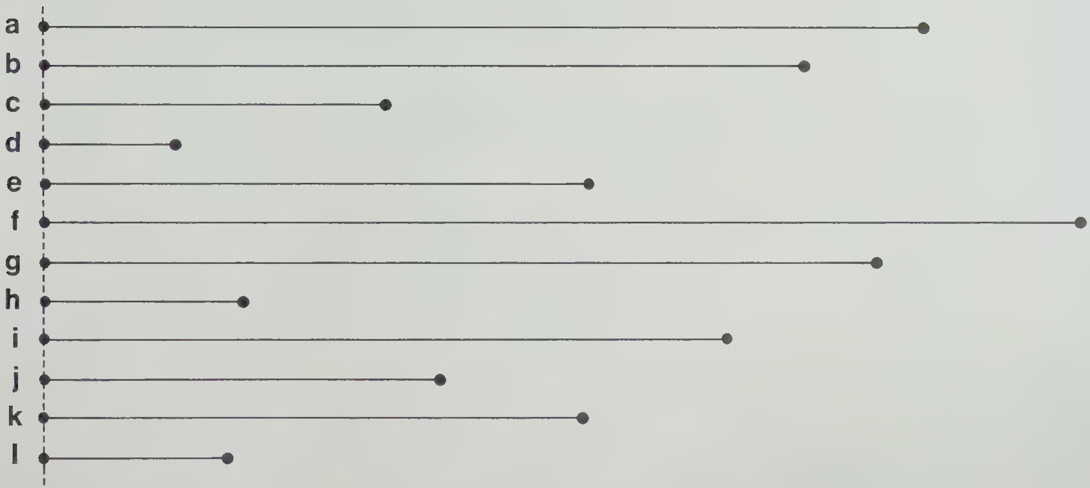
1. What is the measurement of each segment shown between the two rulers?

1. Look at the segment marked above the ruler.
Is it closer to 9 or closer to 10 centimetres long?

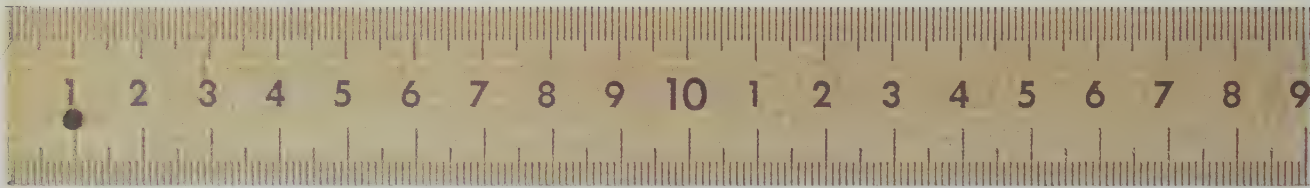


We can say "It is closer to 10 centimetres long" or "It is about 10 centimetres long."

2. Measure each segment below to the nearest centimetre.
Use your centimetre ruler.



A centimetre is quite small. But there are even smaller units in the metric system of measure. They are shown on this ruler.



How many little spaces are there between 0 and 1 cm? Between 1 cm and 2 cm? Each little space is a **millimetre.** There are 10 millimetres in a centimetre.

We write **mm** as a short form for millimetres.

So, 10 mm = 1 cm

Complete the tables

a

Millimetres	Centimetres
10	1
20	2
30	?
40	?
60	?
90	?
100	?

b

Millimetres	Centimetres
10	1
?	2
?	3
?	8
?	10
?	6
?	7

You can use millimetres to measure very small distances. But right now we are going to learn how to measure longer distances.

1. Can you use your centimetre ruler to measure the width of a table?

There's an easier way—you can use a metrestick. A metre is the standard unit of length. All other units of length are based on it. The metre is one hundred centimetres long. A metrestick is one metre, or one hundred centimetres, long.

2. Now, find a metrestick and measure the width of your desk.
About how many centimetres?

3. Alice measured the length of the classroom in metres.
Annie measured the length in centimetres.
They got different numbers. Why?

4. Use the metrestick. Measure in centimetres.

a the length of your arm
b the length of your leg
c the width of the door
d the height of a table or desk
e the width of a window

1. Could you measure the length of your classroom in centimetres? in millimetres?

   Wait! There's an easier way. Use the metrestick. You may need help.

2. Start at one corner and measure one metre along the wall. Hold the mark with your finger and move the stick. Now measure another metre from your finger. Hold the two-metre mark with your finger and move the metrestick again.

   Keep going till you reach the corner of the room. About how many metres did you measure?

3. Use a metrestick to find these distances, to the nearest metre:

   a the width of the classroom
   b the height of the door
   c the width of the hallway
   d the length of the blackboard

   What other things can be measured in metres?

4. Complete the tables.

a

Centimetres	Metres
100	1
200	?
300	?
400	?
600	?
800	?
1000	?

b

Centimetres	Metres
100	1
?	4
?	6
?	8
?	10
?	3
?	2

You might have a metretape in your classroom. You can also make one.

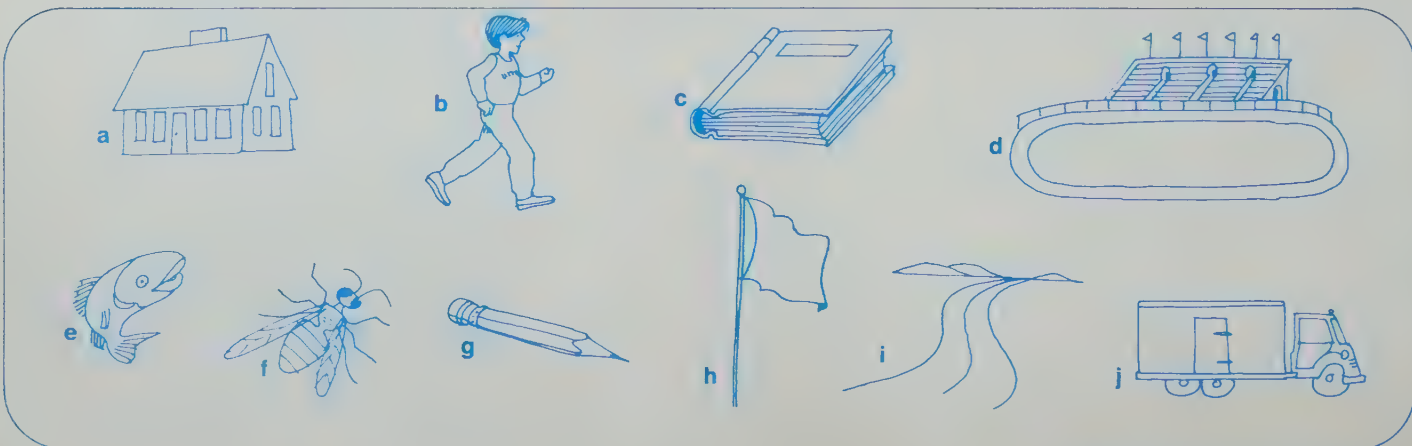
Get a ball of strong string and tie a knot a few cm from the end. Measure one metre from the knot and staple a colored paper tag to the spot. Mark more metres in the same way until you have ten metres. Leave a few cm more and cut the string.

Now, with a helper, you can measure longer lengths.

What lengths can you measure at school? At home? Outside? Make a chart of lengths you and your helper have measured with your metre string.

Length of	Metres
Hall	________________
Car	________________
________________	________________
________________	________________
________________	________________
________________	________________

1. Is there any difference between "how long" and "how tall"?
   a How many centimetres long are you?
   b How many centimetres tall are you?
2. How many centimetres measure the same distance as a metre?
3. How could you measure the length of your classroom?
   a Step it off. How many steps is it?
   b Is one of your steps a standard unit of length?
   c Get a metrestick. How many metres is it?
4. You are going to tell someone about the length of a room. Which measurement could you use so that they would understand?
   a Could you report the length in centimetres?
   b Would there be more centimetres than metres?
5. Would you use centimetres or metres to measure the real things pictured below?



Martin measured a table with a metrestick. He found that the table was longer than one metre. It was 1 metre and 23 centimetres long He wrote down the length: 1 m 23 cm.

George measured the table and wrote down the length: 123 cm.

Martin and George argued about who was right. Then Janet came along and showed them:

1 m 23 cm is the same as
100 cm and 23 cm. And that is the same as 123 cm.

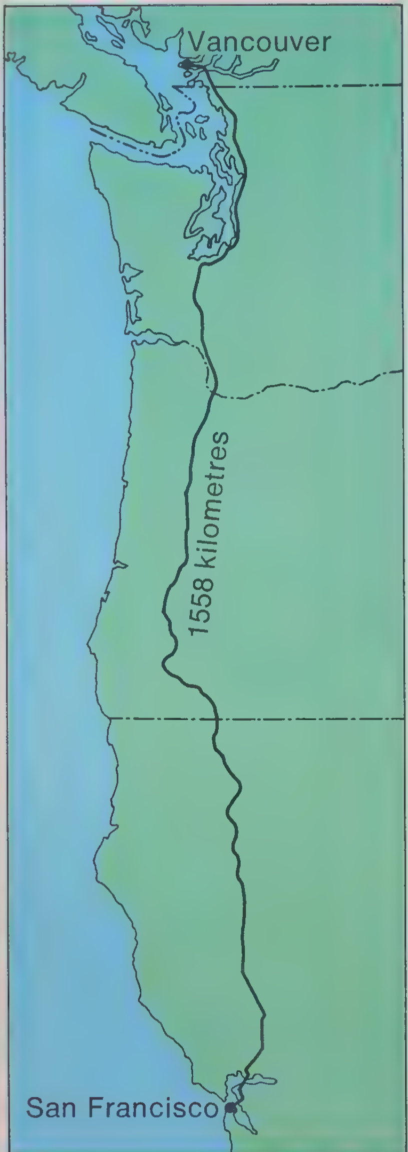
In the metric system we usually write 123 cm
(rather than 1 m 23 cm).

Rewrite these, using only cm.

1 1 m 16 cm
2 1 m 35 cm
3 1 m 96 cm
4 2 m 50 cm
5 2 m 27 cm
6 5 m 95 cm
7 1 m 10 cm

Now try these—

8 2 m 0 cm
9 1 m 5 cm
10 3 m 2 cm



Would you measure the distance from San Francisco to Vancouver in millimetres? in centimetres? in metres? or in some other unit?

In the metric system of measurement, people use **kilometres** to measure long distances. A kilometre is one thousand metres.

Answer these questions.

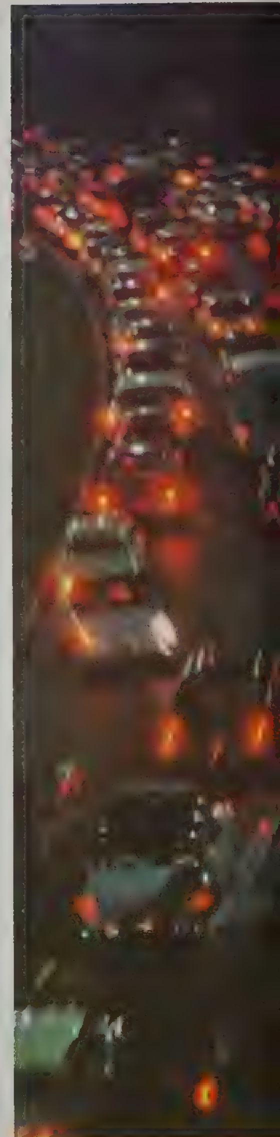
1. Dan's father drove 38 kilometres the first hour. He drove 53 kilometres the second hour. How many more kilometres did he drive the second hour?

2. A carrier pigeon flies 29 kilometres on one trip. It flies 45 kilometres the next trip. How far did the pigeon fly on both trips together?

3. The Vitos went on a camping trip last summer. They drove 420 km the first day, 375 km the second day, and 342 km the third day. How far did they drive in the first three days?

4. The next day, the Vitos set out for a town 327 km away. After they had gone 140 km they found a perfect campsite and decided to stay there overnight. How far did they have to go the next day?

5. Mr. Kostik went to visit his sister in Newtown, 1250 km away. He drove 230 km the first day, 305 km the second day, and 126 km the third day. How far had he gone? How far did he still have to go?



1. These are the length measures you know now:

10 millimetres	=	1 centimetre
100 centimetres	=	1 metre
1000 metres	=	1 kilometre

The short form for kilometre is km. Do you remember all the short forms?

Match the word in column 1 with the short form in column 2.

millimetre	cm
kilometre	m
centimetre	mm
metre	km

2. What would be the best metric unit of measure to use in these questions?

a How wide is the soccer field?
b How far is it to the next town?
c How big is the book?
d How tall is the building?
e How long is the swimming pool?
f How high is the ski jump?
g How wide is the ribbon?
h How long is the new baby?
i How long until dinner? (Look out!)
j How long is the TV program? (There's another one!)

3. Do you suppose there is any difference in the way people all over the world talk about time?

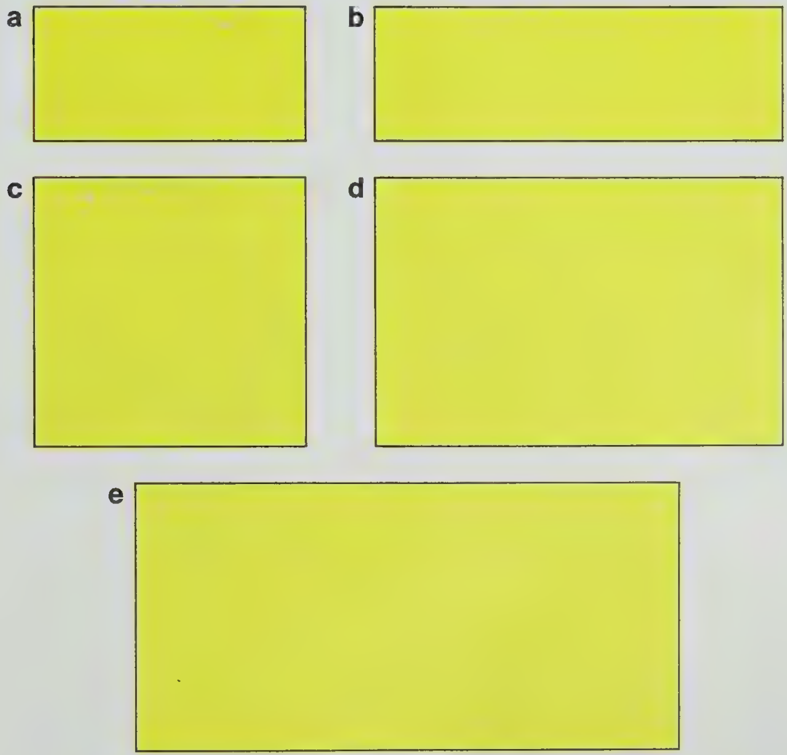
1. How far apart are the boy and the girl? Who has the right answer?

Jon is right if he means 10 metres.
Joan is right if she means 1000 centimetres.
Are 10 metres and 1000 centimetres the same measure?

2. Does a number all by itself mean anything when you are talking about a measurement? If someone said the distance was 100, what else would you need to know before you could understand the distance?

Every square is a rectangle, but every rectangle is not a square.

1. What makes a rectangle a rectangle? Look at the corners and sides of each of these rectangles. Try to get a good answer.



2. Try measuring the lengths of opposite sides. What can you say about those measurements?

3. What is the distance around each of the rectangles above?

CHECKOUT

1. Which is longer?

a	1 metre 1 kilometre	**b**	1 centimetre 1 millimetre	**c**	1 millimetre 1 kilometre
d	1 metre 50 centimetres	**e**	1 centimetre 7 millimetres	**f**	1 metre 137 centimetres
g	1000 cm 1 m	**h**	1000 m 1 km	**i**	1 m 95 cm

2. Which is longest?

a	1 m / 1 cm / 1 km	**b**	3 mm / 1 cm / 2 m	**c**	1 km / 500 m / 700 cm
d	1 km / 1000 cm / 10 m	**e**	1 centimetre 1 metre 1 kilometre	**f**	100 centimetres 100 metres 100 kilometres
g	100 centimetres 10 metres 1 kilometre	**h**	1 kilometre 100 metres 1000 centimetres		

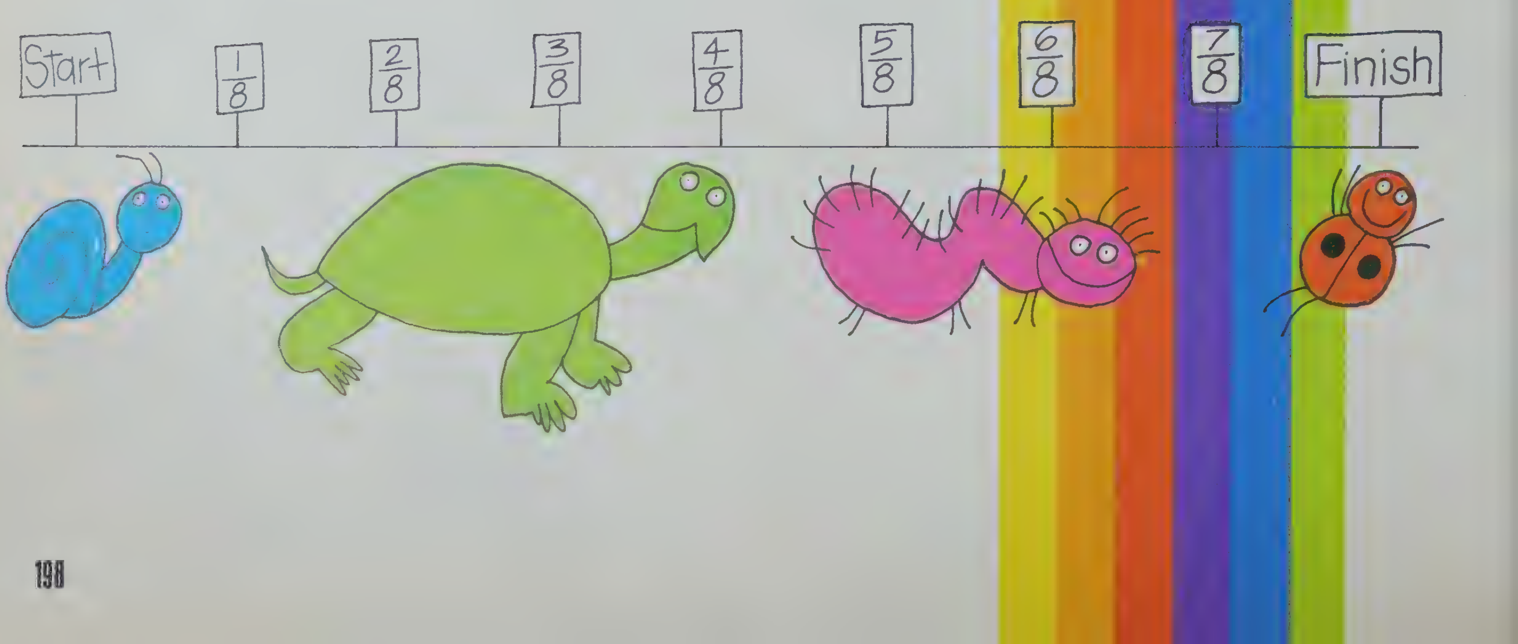
3. Complete:

a	10 mm = ? cm	**b**	3 cm = ? mm	**c**	200 cm = mm
d	1000 m = ? km	**e**	2 km = ? m	**f**	700 cm = ? m
g	3000 m = ? km				


10
FRACTIONS

TomTurtle wasn't the fastest creature in the world. Cappy Caterpillar wasn't very speedy himself. They had covered only a fraction of the track when the race ended.

At least they tried. But poor old Snor Snail didn't even get started.

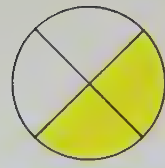


Fractions tell about parts of things. Do they tell more? Your goal is to find out more about numbers called fractions.

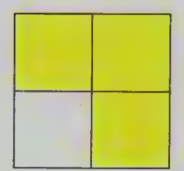
Fractions belong in the real world, too.
Have you ever had $\frac{1}{2}$ of a glass of milk?
Maybe the milk was poured from a $\frac{1}{2}$-litre carton.

Have you ever watched a $\frac{1}{2}$-hour TV program?
Have you ever eaten $\frac{1}{4}$ of a pizza?

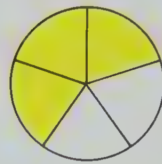
How many shaded?
How many same-size parts in all?
What fraction of the whole is shaded?



How many shaded?
How many same-size parts in all?
What fraction of the whole is shaded?



How many shaded?
How many same-size parts in all?
What fraction of the whole is shaded?
How do you write the fraction?



$\frac{3}{5}$

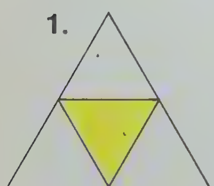
3 ← How many shaded parts? This number is called a numerator.

5 ← How many parts in all? This number is called a denominator.

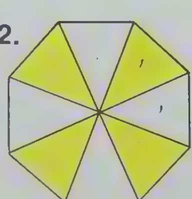
The fraction with numerator and denominator tells **"HOW MUCH."**

What fraction tells how much of the whole is shaded?

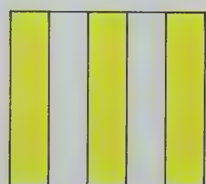
1.



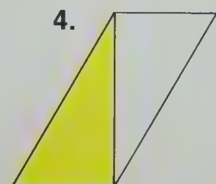
2.



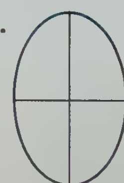
3.



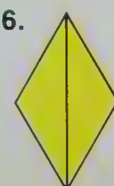
4.

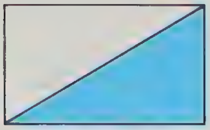


5.



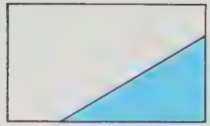
6.



1. 

Does this show $\frac{1}{2}$?

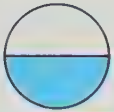
$\frac{1 \longrightarrow \text{shaded}}{2 \longrightarrow \text{in all}}$

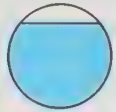
2. 

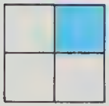
Does this show $\frac{1}{2}$?

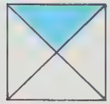
$\frac{1 \longrightarrow \text{shaded}}{2 \longrightarrow \text{in all}}$????

It shows 1 part shaded.
BUT are the 2 parts the same size?

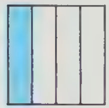
3.  Does this show $\frac{1}{2}$?

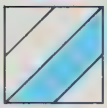
4.  Does this show $\frac{1}{2}$?

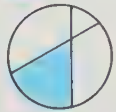
5.  Does this show $\frac{1}{4}$?

6.  Does this show $\frac{1}{4}$?

7.  Does this show $\frac{1}{4}$?

8.  Does this show $\frac{1}{4}$?

9.  Does this show $\frac{1}{4}$?

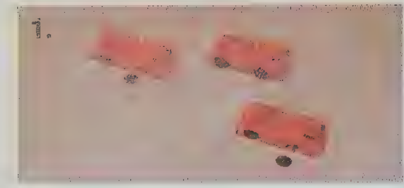
10.  Does this show $\frac{1}{4}$?

Talk about these.

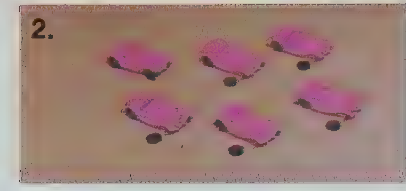
11. Have you heard someone say they got the biggest $\frac{1}{2}$ of the candy bar? Could this be true?

12. If you cut a pizza to share with your friends, do you try to make the pieces the same size? Why?

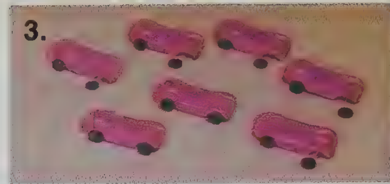
13. Does the denominator of a fraction tell the number of same-size parts in the whole thing? What does the numerator signal?



How many need to be fixed?
How many in all?
What fraction of the total need to be fixed?



How many need to be fixed?
How many in all?
What fraction of the total need to be fixed?



How many need to be fixed?
How many in all?
What fraction of the total need to be fixed?

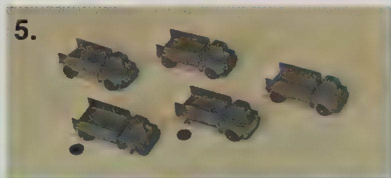
All the objects in the set represent one whole—the total.

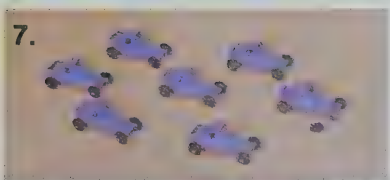
The numerator of the fraction tells how many need to be fixed. → 5

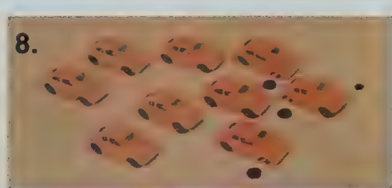
The denominator of the fraction tells how many in total. → 7

$$\frac{5}{7}$$

What fraction of the total needs to be fixed?







Mike had a box of 8 doughnuts.
Jim came by and took 2.
What fraction of the doughnuts were taken?

$\frac{2}{8}$ ← This number is called a numerator–doughnuts taken.
← This number is called a denominator–doughnuts in all.

Jane had a can of 3 tennis balls. 2 were brand-new. 1 had been used. Write a fraction that tells what fraction of the balls were new.

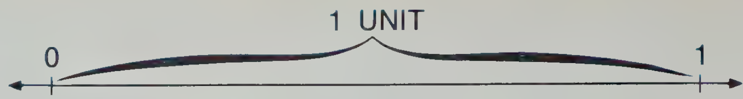
Draw a picture if it will help you answer these problems.

Sam loved animals.

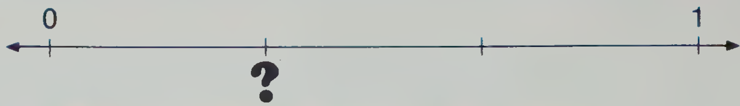
1. He had a collection of 9 bugs. 4 of them were spiders. What fraction of his collection were spiders?
2. He had 7 goldfish in a tank. 2 of them were black. What fraction of the goldfish were black?
3. He had 4 cats, and 1 was male. What fraction of his cats were male?
4. He had 6 turtles. 1 of them came from Florida. What fraction of his turtles came from Florida?

What other kinds of animals do you think Sam had? Make up a story that uses a fraction to describe part of another set of Sam's pets.

1. The distance from 0 to 1 on the number line is one unit.

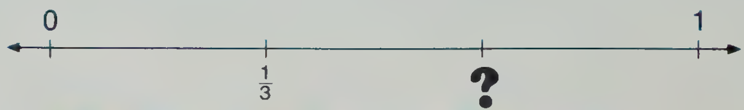


2. Now the distance is divided into 3 same-size parts. The distance from 0 to **?** is what fraction of the whole distance?



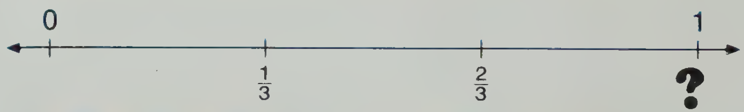
What fraction can name this point?

3. The **?** has moved to a new point.



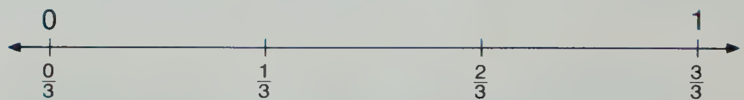
What fraction can name this point?

4. The **?** has moved again! That point is already named "1." Can that point have a fraction name, too?



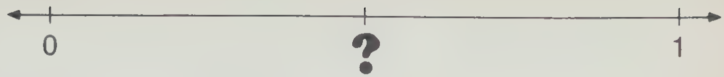
What fraction can name this point?

5. The distance from 0 to $\frac{1}{3}$ is one-third. From $\frac{1}{3}$ to $\frac{2}{3}$ is also one-third. And the length from $\frac{2}{3}$ to $\frac{3}{3}$ is one-third too. How many one-thirds from 0 to 1? Could $\frac{3}{3}$ be another name for 1?



6. **What in the world does $\frac{0}{3}$ mean on this number line?**

1. Look at this number line. The distance from 0 to 1 is marked in 2 same-size parts.



a A teeny, tiny bug wanted to walk from 0 to 1. He started at 0 and got to **?**. He was *so* tired, he had to rest. How much of his walk had he finished? He could not decide what to do. Should he go back to 0? or should he go to 1? Which is the longer walk? What fraction name belongs where the **?** is? How many $\frac{1}{2}$s from 0 to 1? Could $\frac{2}{2}$ be another name for 1?

---

2. Here's another number line.

a The distance between 0 and 1 has been marked in how many same-size parts? How much of the distance is each part? Think about the fraction name for the letters marked on the number line. Remember what a fraction tells you.

b What fraction belongs at each point on the line above?

$\frac{1}{4}$

The numerator tells how many parts you want to talk about.

The denominator tells how many parts in all.

---

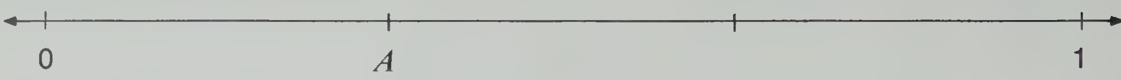
3. It's your turn to draw a number line.

a Make a number line that shows a distance from 0 to 1.

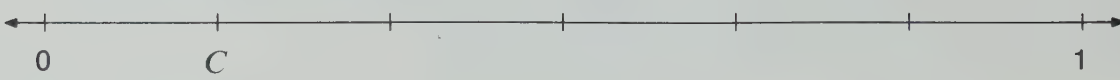
b You decide how many same-size parts the distance should have.

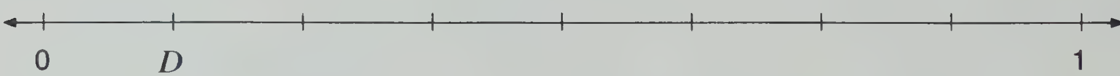
c Label the parts with fractions—the right ones, of course!

Write a fraction for each point labelled with a letter.

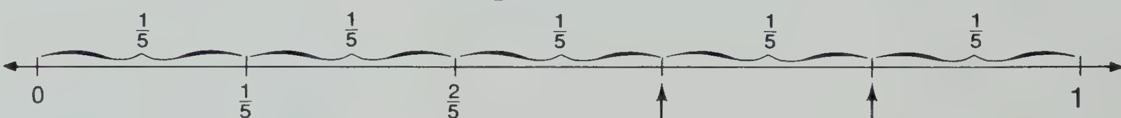
1. 

2. 

3. 

4. 

5. Make sure you know how we can give names to all points on a number line.
This distance is divided into 5 same-size parts.

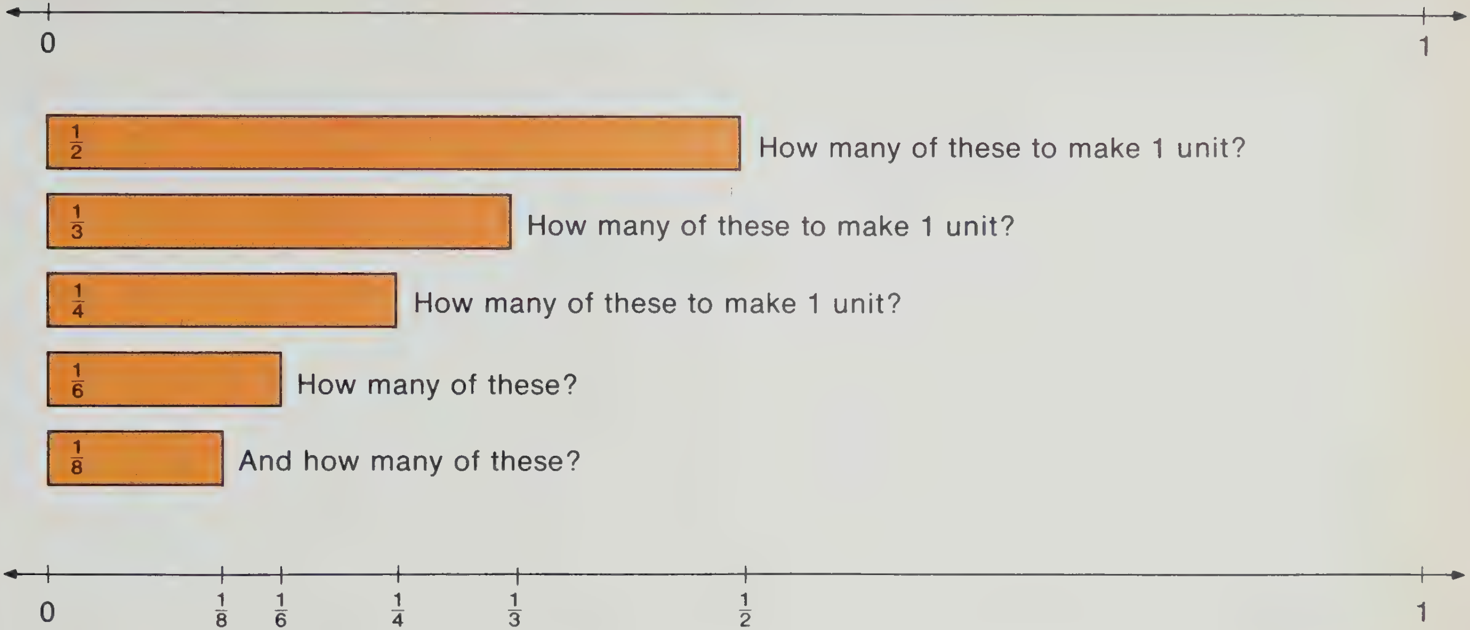


This is $\frac{1}{5}$ of the distance

This is $\frac{2}{5}$ of the distance

- **a** How many $\frac{1}{5}$s from 0 to this point?
- **b** What fraction names the next point?
- **c** How many $\frac{1}{5}$s from 0 to 1? Is $\frac{5}{5}$ another name for 1?

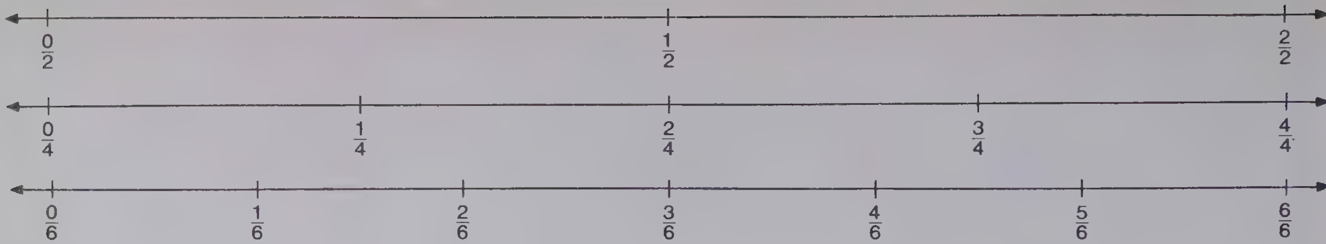
6. Look back. Copy each number line on your paper.
Write the fraction that names each point.



Is the first fraction greater than, less than, or equal to the second fraction? Use the number line for help. Should $>$, $<$, or $=$ be in each ring?

1. $\frac{1}{3}$? $\frac{1}{6}$	**2.** $\frac{1}{8}$? $\frac{1}{2}$	**3.** $\frac{1}{4}$? $\frac{1}{6}$	**4.** $\frac{1}{2}$? $\frac{1}{3}$	**5.** $\frac{1}{6}$? $\frac{1}{3}$
6. $\frac{1}{2}$? $\frac{1}{4}$	**7.** 1 ? $\frac{1}{8}$	**8.** $\frac{1}{2}$? $\frac{1}{6}$	**9.** $\frac{1}{6}$? 0	**10.** $\frac{1}{3}$? $\frac{1}{2}$
11. $\frac{1}{8}$? $\frac{1}{8}$	**12.** $\frac{1}{4}$? $\frac{1}{8}$	**13.** $\frac{1}{4}$? $\frac{1}{3}$	**14.** $\frac{1}{6}$? $\frac{1}{8}$	**15.** $\frac{1}{8}$? $\frac{1}{3}$

Sam bought a sandwich. It was cut into 4 same-size parts. He ate 2 parts. Did he eat less than $\frac{1}{2}$, more than $\frac{1}{2}$, or just $\frac{1}{2}$ of the sandwich?



1. Are the distances from 0 to $\frac{1}{2}$ and from $\frac{1}{2}$ to 1 the same?

2. Is $\frac{2}{2}$ another name for 1?

3. Are the distances from 0 to $\frac{1}{4}$ and from 0 to $\frac{1}{2}$ the same?

4. Are the distances from 0 to $\frac{2}{4}$ and from $\frac{2}{4}$ to $\frac{4}{4}$ the same?

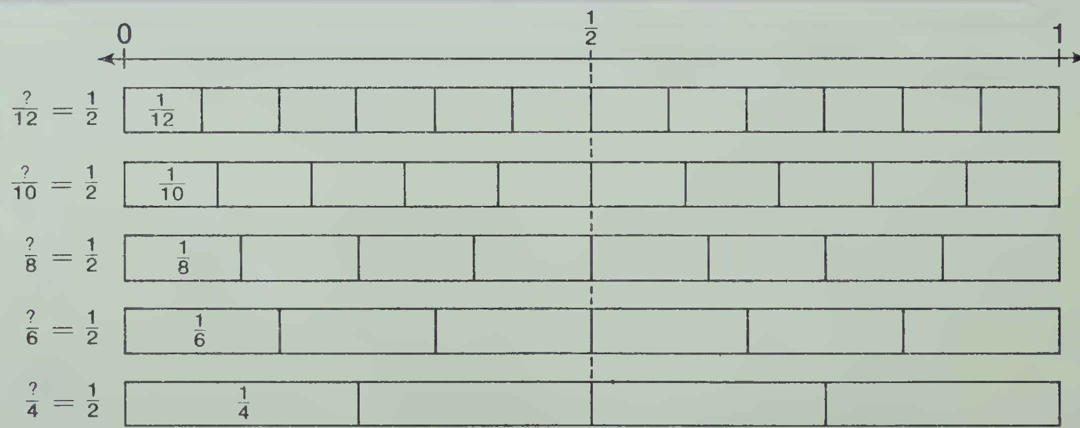
5. Are the distances from 0 to $\frac{1}{2}$ and from 0 to $\frac{2}{4}$ the same? Does $\frac{1}{2} = \frac{2}{4}$?

6. Does $\frac{1}{2} = \frac{3}{6}$? Look at the two distances on the number lines above.

7. Are the distances from 0 to $\frac{2}{4}$ and from 0 to $\frac{3}{6}$ the same? Does $\frac{2}{4} = \frac{3}{6}$?

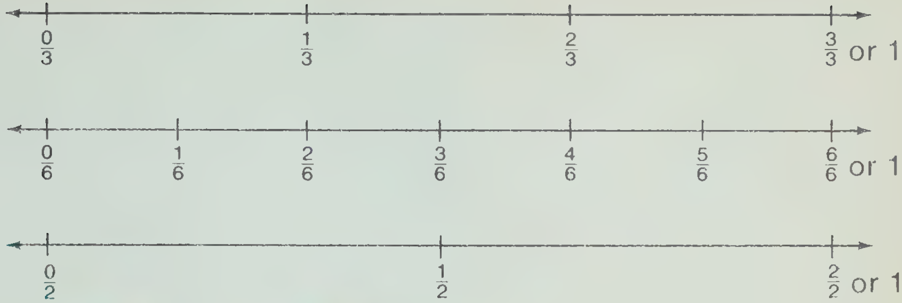
8.

HOW MANY ?

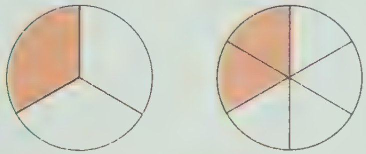


You have found many fraction names for 1.
Now you have many fraction names for $\frac{1}{2}$ too!

Let's go on with the name hunt.



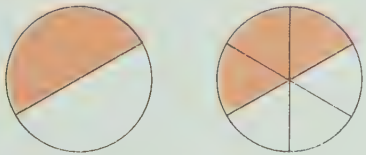
1. Does $\frac{1}{3} = \frac{2}{6}$?
Check by looking at this model.



Are you sure?

---

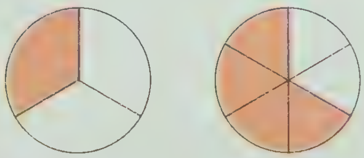
2. Does $\frac{1}{2} = \frac{3}{6}$?
Check by looking at this model.



Are you sure?

---

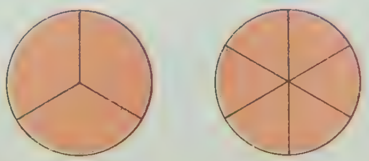
3. Does $\frac{2}{3} = \frac{4}{6}$?
The number line and the models say yes.



Do you agree?

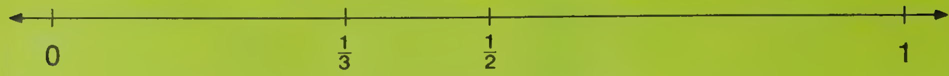
---

4. Does $\frac{3}{3} = \frac{6}{6}$?



5. Draw models to show that $\frac{2}{2} = \frac{3}{3}$.

The number line can be used to show the order of fractions.



Which is greater, $\frac{1}{2}$ or $\frac{1}{3}$? Which is less, $\frac{1}{2}$ or $\frac{1}{3}$?

Should $>$, $<$, or $=$ be in each ring?
The number line below might help.

1. $\frac{1}{3}$? $\frac{1}{6}$ **2.** $\frac{5}{8}$? $\frac{1}{2}$ **3.** $\frac{3}{4}$? $\frac{5}{6}$

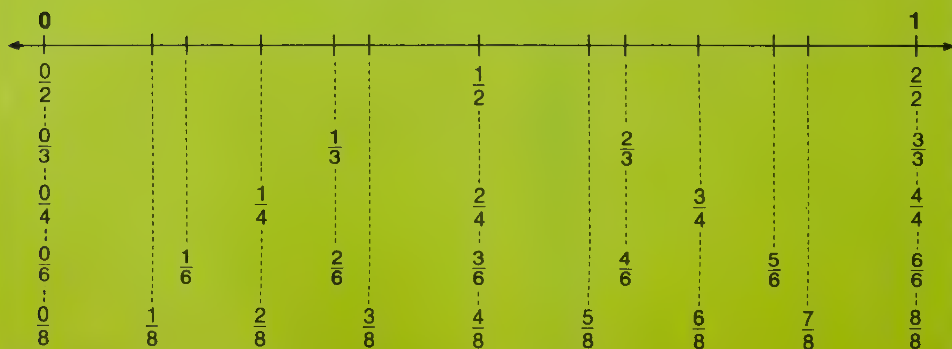
4. $\frac{1}{2}$? $\frac{2}{3}$ **5.** $\frac{4}{6}$? $\frac{2}{3}$ **6.** $\frac{1}{2}$? $\frac{2}{4}$

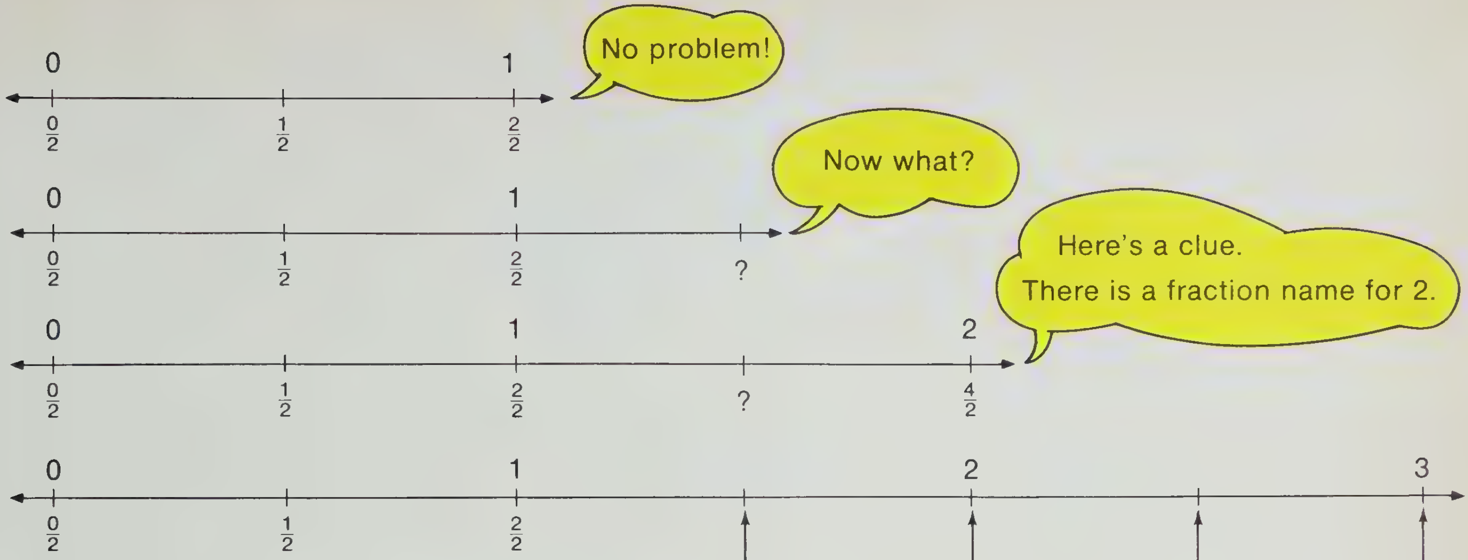
7. 1 ? $\frac{7}{8}$ **8.** $\frac{1}{2}$? $\frac{1}{6}$ **9.** $\frac{1}{6}$? $\frac{1}{6}$

10. $\frac{1}{6}$? 0 **11.** $\frac{2}{3}$? $\frac{1}{2}$ **12.** $\frac{7}{8}$? $\frac{5}{8}$

13. $\frac{1}{4}$? $\frac{2}{8}$ **14.** $\frac{2}{3}$? $\frac{4}{6}$ **15.** $\frac{5}{6}$? $\frac{6}{8}$

16. 0 ? $\frac{1}{3}$ **17.** $\frac{3}{4}$? 1 **18.** 0 ? 1





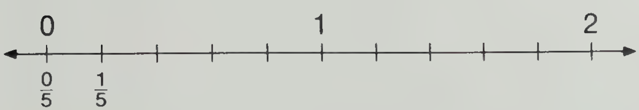
How many halves from 0 to ?

How many halves from 0 to ?

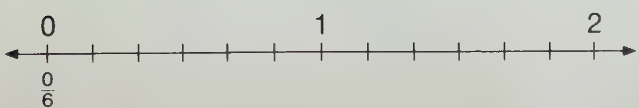
How many halves from 0 to ?

How many halves from 0 to ?

How many thirds from 0 to 1?
That's another name for 1!
How many thirds from 0 to 2?
That's another name for 2!

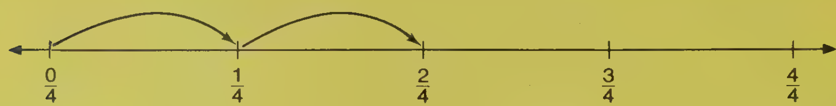


How many fifths from 0 to 1?
That's another name for 1!
How many fifths from 0 to 2?
That's another name for 2!



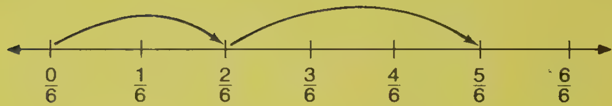
What's another name for 1 on this line?
And another name for 2?
What would be another name for 3?

1. You can add whole numbers. $3 + 2 = 5$
Can you add fractions? $\frac{1}{4} + \frac{1}{4} = \underline{?}$ A number line will help.



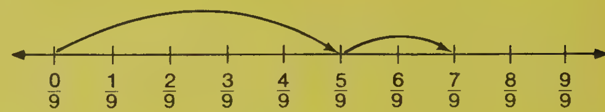
$\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$

a



$\frac{2}{6} + \frac{3}{6} =$ $\frac{5}{6}$

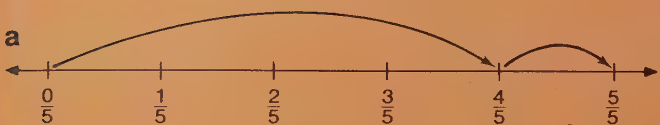
b



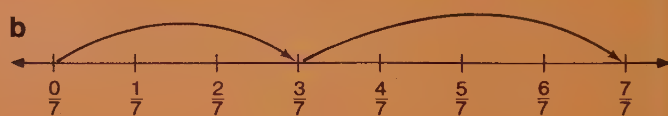
$\frac{5}{9} + \frac{2}{9} =$ $\frac{7}{9}$

2. Write the addition problem shown on each number line.

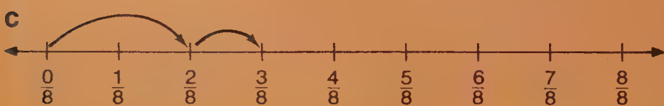
a



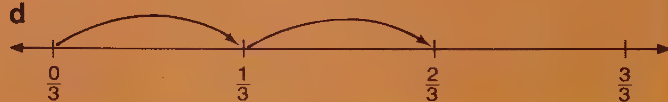
b



c



d



Try some more

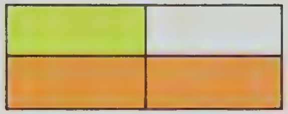
3. $\frac{1}{6} + \frac{4}{6}$ 4. $\frac{1}{9} + \frac{4}{9}$ 5. $\frac{3}{5} + \frac{1}{5}$

6. $\frac{3}{8} + \frac{4}{8}$ 7. $\frac{2}{3} + \frac{1}{3}$ 8. $\frac{1}{2} + \frac{1}{2}$

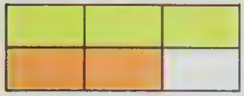
We can use other **MODELS** to show addition too. This region has been separated into 5 parts.

$$\frac{3}{5} + \frac{1}{5} = ?$$

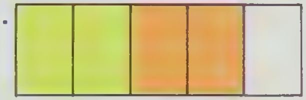
Now try these

1. 

$\frac{1}{4} + \frac{2}{4} = \underline{?}$

2. 

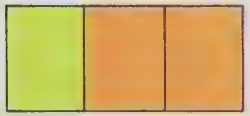
$\frac{3}{6} + \frac{2}{6} = \underline{?}$

3. 

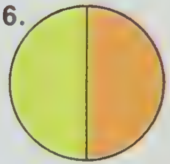
$\frac{2}{5} + \frac{2}{5} = \underline{?}$

4. 

$\frac{2}{8} + \frac{3}{8} = \underline{?}$

5. 

$\frac{1}{3} + \frac{2}{3} = \underline{?}$

6. 

$\frac{1}{2} + \frac{1}{2} = ?$

Draw a number line or a region if you need help on these.

7. $\frac{1}{5} + \frac{2}{5} = \underline{?}$ **8.** $\frac{1}{5} + \frac{1}{5} = \underline{?}$ **9.** $\frac{3}{8} + \frac{1}{8} = \underline{?}$ **10.** $\frac{1}{6} + \frac{1}{6} = \underline{?}$ **11.** $\frac{3}{9} + \frac{4}{9} = \underline{?}$

12. $\frac{5}{7} + \frac{1}{7} = \underline{?}$ **13.** $\frac{5}{8} + \frac{2}{8} = \underline{?}$ **14.** $\frac{0}{4} + \frac{1}{4} = \underline{?}$ **15.** $\frac{3}{4} + \frac{3}{4} = \underline{?}$ **16.** $\frac{3}{5} + \frac{2}{5} = \underline{?}$

If I had $\frac{3}{4}$, could I give you $\frac{1}{4}$?
How much would I have left?

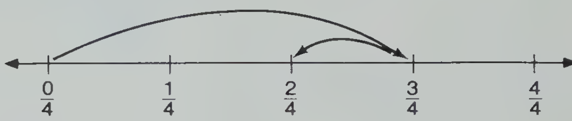
If you had $\frac{2}{3}$, could I have $\frac{1}{3}$?
How much would you have left?

If they had $\frac{4}{5}$, could we have $\frac{2}{5}$?
How much would they have left?

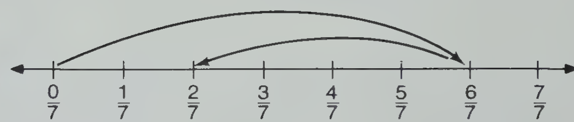
If you could answer those three questions,
you know how to

SUBTRACT

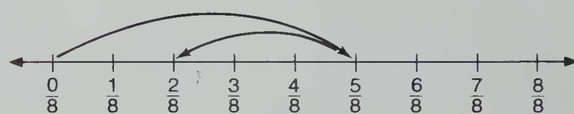
If you couldn't answer those questions, don't feel blue.
This page will help you.



This shows $\frac{3}{4} - \frac{1}{4}$. What remains?



This shows $\frac{6}{7} - \frac{4}{7}$. What remains?



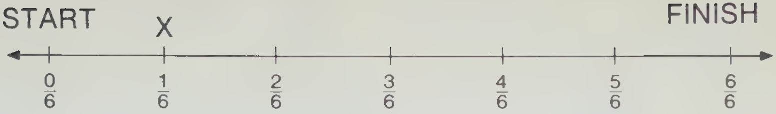
This shows $\frac{5}{8} - \frac{3}{8}$. What remains?

Try these.

1. $\frac{5}{6} - \frac{1}{6}$ **2.** $\frac{2}{3} - \frac{1}{3}$ **3.** $\frac{4}{9} - \frac{2}{9}$ **4.** $\frac{7}{9} - \frac{5}{9}$

5. $\frac{4}{4} - \frac{1}{4}$ **6.** $\frac{4}{5} - \frac{3}{5}$ **7.** $\frac{7}{8} - \frac{6}{8}$ **8.** $\frac{6}{7} - \frac{4}{7}$

1. There was to be a relay race.
There were to be 6 runners.
Each runner was to run $\frac{1}{6}$ of the distance.



The first runner finished his part of the race.
How much more of the distance had to be covered?
How many more runners had to run?

Draw a picture if you need help on these.

2. Bill took $\frac{1}{8}$ of the cake.
His big brother took $\frac{3}{8}$ of the cake.
How much was taken by Bill and his brother?
How much of the cake was left?

3. June put $\frac{1}{4}$ of the stuff away.
Her mom put another $\frac{1}{4}$ of it away.
How much was put away?
How much was left?

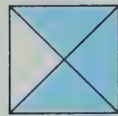
4. The horse got $\frac{1}{2}$ of the bale of hay.
The cow got $\frac{1}{2}$ of the same bale of hay.
How much of the bale of hay was used?
How much of the bale was left?

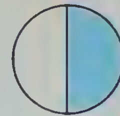
5. He used $\frac{3}{8}$ of the ribbon for his package.
And she used $\frac{5}{8}$ of the ribbon for her package.
How much of the ribbon was used?
How much of the ribbon was left for me to use?

6. The first night he read $\frac{1}{3}$ of the book.
The next night he read another $\frac{1}{3}$.
How much had he read by then?
How much more did he have to read?

CHECKOUT

1. What fraction of the whole figure is shaded?

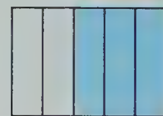
a 

b 

c 

d 

e 

f 

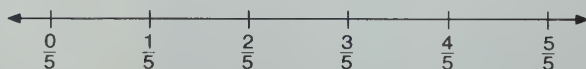
2. Should >, <, or = be in each ring?

a $\frac{1}{2}$? $\frac{1}{4}$ b $\frac{6}{8}$? $\frac{7}{8}$ c $\frac{2}{2}$? 1 d $\frac{8}{8}$? $\frac{5}{5}$

*3. Add. Use the number line if you need it.

a $\frac{2}{8} + \frac{3}{8}$ b $\frac{1}{8} + \frac{5}{8}$ c $\frac{3}{8} + \frac{2}{8}$ d $\frac{4}{8} + \frac{4}{8}$

*4. Subtract. Use the number line if you need it.



a $\frac{2}{5} - \frac{1}{5}$ b $\frac{4}{5} - \frac{2}{5}$ c $\frac{5}{5} - \frac{3}{5}$ d $\frac{3}{5} - \frac{2}{5}$

11 MULTIPLICATION AND DIVISION

They were planning a picnic. They had to decide how much food to buy.

1. They needed 48 hotdogs.
Hotdogs came in packages of 8.
How many packages did they need?

2. They needed 48 hotdog buns.
Buns came in packages of 6.
How many packages did they need?

3. They needed 18 apples.
Apples were packed in trays of 3.
How many packages did they need?

4. They needed 24 oranges.
Oranges were packed in trays of 4.
How many packages did they need?

5. They needed 21 big dill pickles.
Pickles were packed in threes.
How many packs of 3 did they need?

6. They needed 30 lemons for lemonade.
Lemons were packed in trays of 5.
How many packages did they need?

7. They needed 42 servings of ice cream.
There were 6 servings in 1 container.
How many containers did they need?

8. They also needed catsup and mustard.
How much do you think they should buy?
What other food should they buy?

You have been using the idea
of division to get your answers.
Your

GOAL

is to learn a lot about division.
But as for now, keep on
planning the picnic.

9. Can you figure out how many people they were going to feed? Why did you decide on that number?

10. Do you think they should plan to bring things other than food?
    - **a** What about paper plates? How are paper plates packaged?
    - **b** What about paper cups? How many packages?
    - **c** What about plastic forks? Do they come in packages too?
    - **d** What about napkins? Would a roll of paper towels work just as well? Which do you think would be cheaper?

X X X X
X X X X
X X X X

1. This array has 3 rows of 4.
   How many in all? $3 \times 4 = \underline{?}$
   How many in all if the array had shown 4 rows of 3? $4 \times 3 = \underline{?}$
   Both 3 and 4 are factors. Your answer is a product.
   The order of the factors does not change the product.

2. You draw an array of 12 objects in all.
   Make each row have 6 objects.
   How many rows did you show? $\blacksquare \times 6 = 12$
   Here the product was given. And you know one factor.
   You had to find a missing factor.

3. You draw an array of 24 objects in all.
   Make 8 rows.
   How many objects in each row? $8 \times \blacksquare = 24$
   Again the product was given. And you know one factor.
   You had to find a missing factor.

4. Find the missing factors. You can make an array to help if you need to.

a $2 \times \blacksquare = 10$	**b** $3 \times \blacksquare = 15$	**c** $4 \times \blacksquare = 8$
d $3 \times \blacksquare = 9$	**e** $5 \times \blacksquare = 5$	**f** $2 \times \blacksquare = 18$
g $\blacksquare \times 4 = 16$	**h** $\blacksquare \times 7 = 28$	**i** $\blacksquare \times 5 = 20$
j $\blacksquare \times 8 = 16$	**k** $\blacksquare \times 6 = 18$	**l** $\blacksquare \times 7 = 21$
m $5 \times \blacksquare = 25$	**n** $\blacksquare \times 3 = 21$	**o** $\blacksquare \times 8 = 32$
p $9 \times \blacksquare = 27$	**q** $7 \times \blacksquare = 28$	**r** $\blacksquare \times 9 = 36$

Think about big boxes, little boxes, middle-sized boxes.
Each box has objects inside. You decide what's inside.
Each box has the objects packed in trays.
There is more than one tray in each box.
There are the same number of objects in each tray.
You will know how many there are in all.
You will know how many trays.

Your job is to find how many in each tray.

1. 8 in all.
2 trays.
How many in each tray? $2 \times \underline{?} = 8$

2. 10 in all.
5 trays.
How many in each tray?
$5 \times \underline{?} = 10$

3. 6 in all.
3 trays.
How many in each tray?
$3 \times \underline{?} = 6$

4. 16 in all.
4 trays.
How many in each tray?
$4 \times \underline{?} = 16$

5. 15 in all.
3 trays.
How many in each tray?
$3 \times \underline{?} = 15$

6. 12 in all.
2 trays.
How many in each tray?
$2 \times \underline{?} = 12$

7. 30 in all.
5 trays.
How many in each tray?
$5 \times \underline{?} = 30$

You found a missing factor in each of these problems.

1. There were twelve cookies in the cookie jar.

a If two people divided them equally, how many for each?

b If three people divided them equally, how many for each?

c If four people divided them equally, how many for each?

d If six people divided them equally, how many for each?

e If twelve people divided them equally, how many for each?

f

10 cookies	
2 people	? each
5 people	? each
10 people	? each

g

18 cookies	
2 people	? each
3 people	? each
6 people	? each
9 people	? each
18 people	? each

h

14 cookies	
2 people	? each
7 people	? each
14 people	? each

i

6	
2	?
3	?
6	?

j

16	
2	?
4	?
8	?
16	?

k

8	
2	?
4	?
8	?

l

36	
4	?
6	?
9	?

m

9	
3	?
9	?

n

20	
4	?
5	?
10	?

The word *divide* has been used many times. You know how to add, subtract, and multiply numbers. There is one more operation on numbers to explore.

Get ready to divide numbers.

To find a missing factor, you can use the operation of division.
$3 \times \underline{?} = 15$ could be written $15 \div 3 = \underline{?}$.
The symbol $\div$ is the division sign. $15 \div 3 = \underline{?}$ is read
"15 divided by 3 equals what number?"

Division is closely related to multiplication.
If $27 \div 9 = 3$, then it must also be true
that $9 \times 3 = 27$. Is that true?

$12 \div 6 = \underline{?}$	$15 \div 3 = \underline{?}$
since $6 \times \underline{?} = 12$	since $3 \times \underline{?} = 15$

1. Complete each division sentence.
Use the missing-factor sentence to help you.

a $4 \div 2 = \underline{?}$
$2 \times \underline{?} = 4$

b $18 \div 3 = \underline{?}$
$3 \times \underline{?} = 18$

c $20 \div 4 = \underline{?}$
$4 \times \underline{?} = 20$

d $25 \div 5 = \underline{?}$
$5 \times \underline{?} = 25$

e $14 \div 7 = \underline{?}$
$7 \times \underline{?} = 14$

f $15 \div 5 = \underline{?}$
$5 \times \underline{?} = 15$

g $18 \div 9 = \underline{?}$
$9 \times \underline{?} = 18$

h $24 \div 8 = \underline{?}$
$8 \times \underline{?} = 24$

i $6 \div 2 = \underline{?}$
$2 \times \underline{?} = 6$

j $28 \div 7 = \underline{?}$
$7 \times \underline{?} = 28$

k $30 \div 6 = \underline{?}$
$6 \times \underline{?} = 30$

l $35 \div 7 = \underline{?}$
$7 \times \underline{?} = 35$

m $36 \div 6 = \underline{?}$
$6 \times \underline{?} = 36$

n $35 \div 5 = \underline{?}$
$5 \times \underline{?} = 35$

o $27 \div 9 = \underline{?}$
$9 \times \underline{?} = 27$

Here are some symbols that are all mixed up. Can you rearrange them so that they make a multiplication or a division sentence?

1. × 36 ? = 6

2. 45 = ÷ 9 ?

3. ÷ = 14 ? 2

4. 56 ? ÷ 8 =

5. 9 ? = × 72

6. 9 ÷ ? 36 =

7. 6 9 × = ?

8. 7 = × 9 ?

9. Go back and find a number that can replace the **?** and make each sentence true.

10. Write each of these missing-factor sentences as a division sentence.

a 5 × ? = 15 **b** ? × 5 = 10 **c** ? × 3 = 27

d 9 × ? = 81 **e** 4 × ? = 4 **f** ? × 5 = 45

g Replace each ? with a number to make the division sentence true.

1. Count by 2s to 18.

2, 4, 6, 8, 10, 12, 14, 16, 18

a How many 2s to make this number?
b How many 2s to make this number?
c How many 2s to make this number?

2. Count by 3s to 27.

3, 6, 9, 12, 15, 18, 21, 24, 27

a How many 3s in this number?
b How many 3s in this number?
c How many 3s in this number?

3. Count by 4s to 36.

4, 8, 12, 16, 20, 24, 28, 32, 36

a How many 4s in ?
b How many 4s in ?
c How many 4s in ?

4. Count by 5s to 45.

5, 10, 15, 20, 25, 30, 35, 40, 45

a How many 5s in ?
b How many 5s in ?
c How many 5s in ?

Somebody has arranged columns of numbers. They left a note and said each number was in its place for a reason. Figure out how the numbers are related to one another. Then complete each column.

1	2	3	4
0	0	0	0
6	7	8	9
12	14	16	18
18	21	24	27
24	28	32	**a** ___
30	35	**a** ___	**b** ___
36	**a** ___	**b** ___	**c** ___
a ___	**b** ___	**c** ___	**d** ___
b ___	**c** ___	**d** ___	**e** ___
c ___	**d** ___	**e** ___	**f** ___

5 Your completed columns above can help you with these problems.

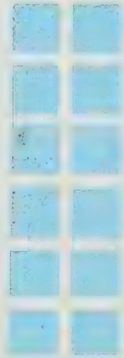
a How many 7s in 7? **b** How many 9s in 18? **c** How many 9s in 45?

d How many 7s in 42? **e** How many 8s in 40? **f** How many 6s in 48?

g How many 8s in 56? **h** How many 6s in 54? **i** How many 7s in 56?

j How many 8s in 64? **k** How many 9s in 63? **l** How many 8s in 72?

There were 12 boxes for Jay to carry.
He took 2 boxes at a time.
How many trips did he make?



Think How many 2s in 12?

Does $2 \times 2 = 12$? NO!
$3 \times 2 = 12$? NO!
$4 \times 2 = 12$? NO!
$5 \times 2 = 12$? NO!
$6 \times 2 = 12$? YES!

Check your thinking.
Make sure there are 6 sets of 2 in 12.

1. Jim had 12 boxes to move also.
He took 3 at a time.
How many trips did he have to make?

Think How many 3s in 12?

2. Big Bill was really strong.
He moved his 12 boxes 4 at a time.
How many trips did he make?

Think How many 4s in 12?

3. Tiny Tim wasn't so strong. But he was smart.
He got a wagon. The wagon held 6.
How many trips did he make to move the 12 boxes?

Think How many 6s in 12?

$56 \div 7 = ?$
or
$? \times 7 = 56$

If you run into trouble, you can try another way.
Ask yourself, How many 7s in 56?
Try some good guessing.

There are more than 5, because	$5 \times 7 = 35$
There are more than 6, because	$6 \times 7 = 42$
There are more than 7, because	$7 \times 7 = 49$
Are there 8?	$8 \times 7 = 56$

There is nothing wrong with making a good guess and then checking. In fact, the "good guess–check" idea is a very good way to solve lots of problems.

1. $63 \div 9 = \underline{?}$ If you don't know, think, How many 9s in 63?
There are more than 5. Right? Why?
Are there more than 6? Why?
Are there more than 7? Why?
How many 9s in 63?

2. $54 \div 6 = \underline{?}$ If you don't know, think, How many 6s in 54?
More than 6? Why?
More than 7? Why?
More than 8? Why?
More than 9? Why?
How many 6s in 54?

3. When some people use this idea, they like to write the division sentence in a computation form. They write

$9\overline{)72}$ rather than $72 \div 9$.

This form makes it easier to think, How many 9s in 72? Where could you put the answer?

$72 \div 9 = \underline{?}$ or $9\overline{)72}$ ← That's the place for your answer to how many 9s in 72.

Are there more than 5? Why?
Are there more than 6? Why?
More than 7? Why?
More than 8? Why?

You might have had a better guess to start with than 5.
You can start anywhere. You will know if you made a bad guess.

$27 \div 9 = \underline{?}$ or $9\overline{)27}$

How many 9s in 27?
More than 5? Oooops!
What happened?
This is how you will know a bad guess.

You know how the game is played. Complete these division problems.
Don't forget to put the answer in the right place.

	a	b	c	d	e	f
1.	$7\overline{)49}$	$6\overline{)48}$	$7\overline{)63}$	$9\overline{)81}$	$6\overline{)42}$	$8\overline{)72}$
2.	$8\overline{)64}$	$5\overline{)35}$	$4\overline{)28}$	$4\overline{)36}$	$3\overline{)24}$	$9\overline{)63}$
3.	$5\overline{)45}$	$7\overline{)42}$	$5\overline{)40}$	$7\overline{)35}$	$9\overline{)54}$	$6\overline{)54}$

Were you a winner?

1. Bob bought —

a 2 for 15¢. He paid another 1¢ in tax.
How much in all?
How much for each one?

b 2 for 17¢. He paid another 1¢ in tax.
How much in all?
How much for each one?

c 3 for 9¢. He didn't have
to pay tax on 9¢.
How much for each one?

d 4 for 30¢. He paid another 2¢ in tax.
How much in all?
How much for each one?

e 5 for 5¢. He didn't
have to pay tax on 5¢.
How much for each one?

f 6 for 24¢. This price
included tax.
How much for each one?

g 8 for 40¢. This price
included tax.
How much for each one?

h 2 for 4¢. He didn't have
to pay tax on 4¢.
How much for each one?

i 3 for 14¢. He paid another 1¢ in tax.
How much in all?
How much for each one?

1. There are times when we divide real objects that the division doesn't come out even. Something remains. We have to decide what to do with the things that remain.

   a There were 7 cookies. 2 people got 3 each. 1 cookie remains. What can you do with it?

   b There are 3 sticks of gum. 2 people got 1 each. 1 stick remains. What can you do with it?

   c There are 25 people. 8 people got on 3 teams. 1 person remains. What can you do with him?

   d There are 14 marbles. 4 people get 3 each. 2 marbles remain. What do you do with them?

   e There is 1 book. Two people want it. What can you do about this?

2. Switch your thinking cap a little bit. Here are situations that also deal with division that doesn't come out even.

   a There are 28 people who are going. 6 people can go in one car. How many cars are needed?

   b There are 22 things to be boxed. 4 things fit in each box. How many boxes are needed?

CHECKOUT

1. There were 24 people in the band.

   a If they marched 2 in a row, how many rows would there be?

   b If they marched 3 in a row, how many rows would there be?

   c If they marched 4 in a row, how many rows would there be?

   d If they marched 5 in a row, how many rows would there be?

   e If they marched 6 in a row, how many rows would there be?

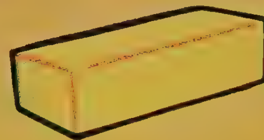
   f If they marched 7 in a row, how many rows would there be?

   g If they marched 8 in a row, how many rows would there be?

   h If they marched 24 in a row, how many rows would there be?


12
29
55
10¢

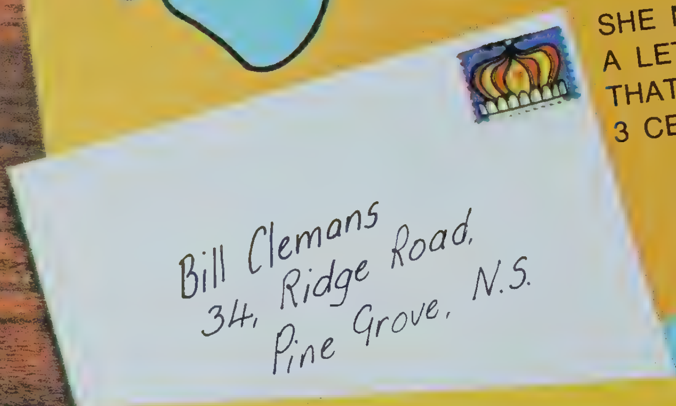
What's Wrong Here?



HE WAS SUPPOSED TO BUY A METRE OF BUTTER.

THE BABY WEIGHS 9 CENTIMETRES

SHE SAID SHE GAINED WEIGHT— A METRE MORE THAN LAST WEEK!



SHE MAILED A LETTER THAT WEIGHED 3 CENTIMETRES.

How Should You Measure Weight?

In kilograms? By the gram?

With a ruler or with a scale?

How many different kinds of scales have you seen?

YOUR GOAL is to find out how you can measure weight.

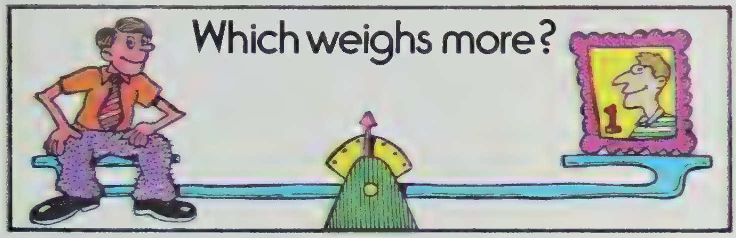
In the metric system of measure, we can measure mass, or weight, as easily as we measure length.

Although **mass** is the correct word, many people use the word **weight.** Mass and weight are not the same thing, but we will use **weight.**

The standard unit of weight is the gram. It is quite small. Two paperclips weigh about one gram. For weighing bigger things we use the kilogram.

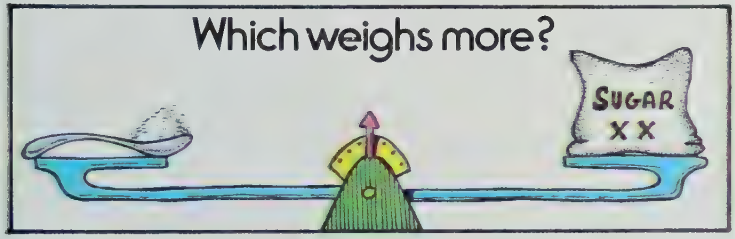
Do you remember that there are 1000 metres in a kilometre?

Kilo means **one thousand.** There are 1000 grams in a kilogram.



1. A man or a postage stamp

- **a** What unit of weight would be used to describe a man's weight?
- **b** What unit of weight would be used to describe a postage stamp?



2. A spoonful of sugar or a full bag of sugar

- **a** What measure would be used to describe the weight of a spoonful of sugar?
- **b** What measure would describe the full bag of sugar?

3. An apple or an orange

- **a** What measure might be used to describe the weight of either one?

What unit of weight would you use to describe each of the following?

a A slice of bread

b Your weight

c A sack of potatoes

d One potato

e A dish of cereal

f The weight of a car

1

Which would have to be put in the larger package?

a A kilogram of bread or a kilogram of butter

b 100 grams of nuts still in the shell or 100 grams of shelled nuts

c A kilogram of feathers or a kilogram of wet sand

d A kilogram of stacked paper or a kilogram of wadded-up paper

e A kilogram of popped popcorn or a kilogram of unpopped popcorn

2

And what about the size and shape?

a Is every package that contains a kilogram of butter the same size and shape?

b Is every loaf of bread that weighs the same the same size and shape?

c Is every kind of cheese that weighs the same the same size and shape?

d Does a short person always weigh less than a tall person?

3

How much do you weigh?

Find out, please

If you know your weight, report it on the chalkboard.

1. How many people reported their weight?
2. Arrange the weights in order from least to most.
3. Do two or more people weigh about the same?
4. Is the tallest person the heaviest?
5. Is the shortest person the lightest?

TALK ABOUT THESE.

6. Will everyone weigh the same a year from now?
7. Do you know if the person who weighs the least now will weigh the least next year?
8. Do you know if the tallest person now will be the tallest person one year from now?
9. Are all people the same age the same weight?
10. Are all people the same height the same weight?
11. Have you heard of someone having a small frame or a large frame? What does that mean? Could it make a difference in what a person weighs?

You have talked about grams and kilograms.
BUT do you really know what these weights feel like?

1. You can't feel how much you weigh, because you can't pick yourself up. Besides that, that's too much weight for you to lift. You can pick up 1 kilogram and feel the weight.

   a Find something that weighs about one kilogram, perhaps a bag of sugar. A litre container filled with water weighs about one kilogram.

   b Put the kilogram weight in your left hand. Now pick up something else in your right hand. Does it weigh about the same? Switch the kilogram weight to your right hand to test and make sure the two weights feel about the same. Try something else.

2. Make a chart of your tests. Write the names of the objects you lifted. Are they about the same, more than, or less than 1 kilogram?

Name of object lifted	Weighs about 1 kilogram	Weighs more than 1 kilogram	Weighs less than 1 kilogram
plant		✓	

A scale "feels" the weight of objects too. Some scales have a kind of number line showing and a pointer. Sometimes the number line moves. Sometimes the pointer moves.

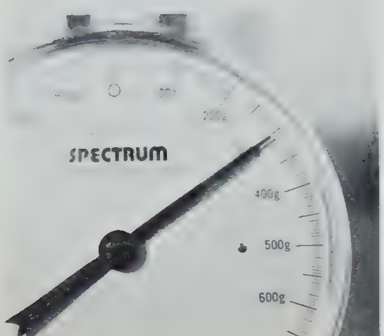
1. Here is a scale that records grams.

   a The numbers look like those on a clock. How is the scale's face different from a clock?

   If you put something in the pan, the weight pushes on a spring. The spring is connected to the pointer. The pointer moves and shows how much the object weighs.

   b If the hand goes around only once, what is the most weight this scale could show?

2. Here are enlarged pictures of the part from 0 to 500 grams.



The number line from 0 to 100 has 20 marks. Each mark stands for 5 grams.

a How many grams does the scale on the left show?

b How many grams does the scale on the right show?

1. Here's another scale. It is the kind most people use to weigh themselves.

   The number line moves on this scale. You can see only part of it at one time.

   a Can you figure out why the 130 is marked on the scale? What does it stand for?

   Look at just a small part of the scale's number line.

   b Most scales are marked like this. How many marks does it have? What does each mark stand for?

2. What weight does each scale show?

a

b

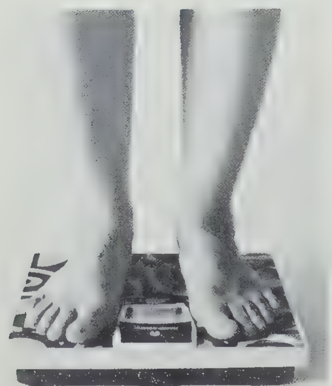
c

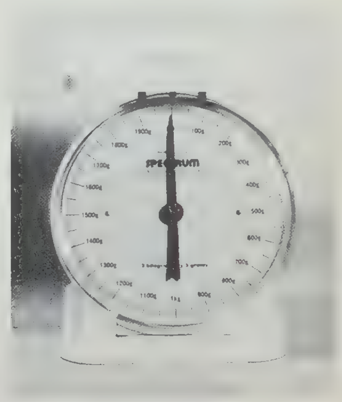
These scales are all different. But they all measure the same thing—weight. Some scales measure in grams. Some measure in kilograms.

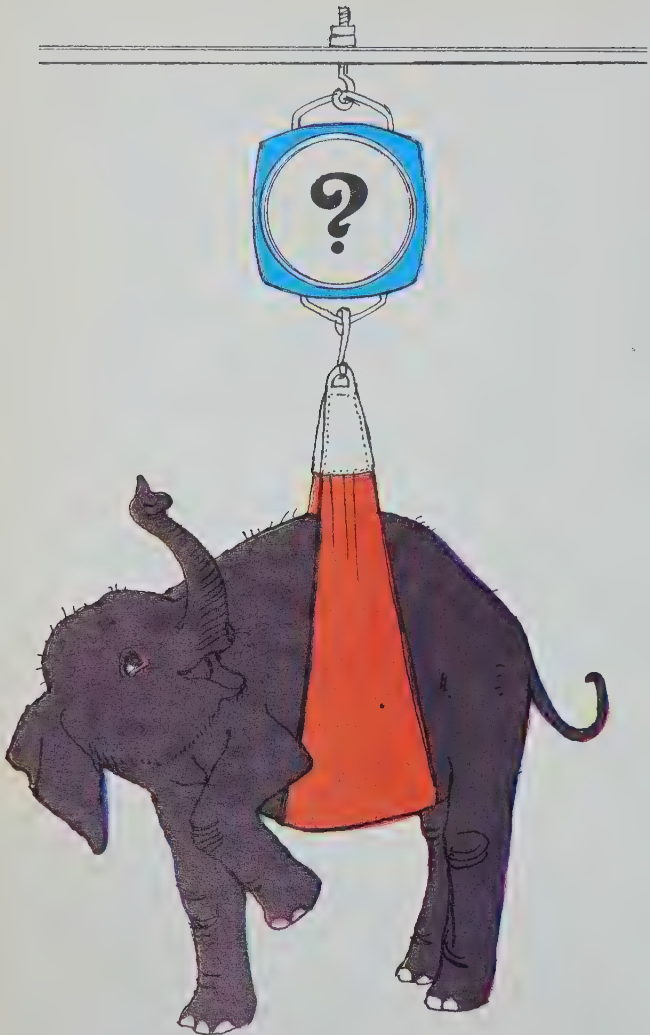
The short form **g** is used for gram, or grams. The symbol **kg** is used for kilogram, or kilograms.

What does each little mark on each scale stand for?

What kinds of things could you weigh on each scale?
Where might you find each of these scales?
What other kinds of scales have you seen?







A gram is a small measure of weight.

Two paperclips weigh about a gram.

A kilogram is a much larger measure of weight.

A litre of water weighs about a kilogram.

Which measure would you use to weigh

a a fullgrown elephant?

b a baby elephant?

c a handful of sand?

d a slice of meat?

e a sack of potatoes?

f yourself?

g a car?

h six sugar cubes?

i this book?

j a carton of books?

k an ice cream cone?

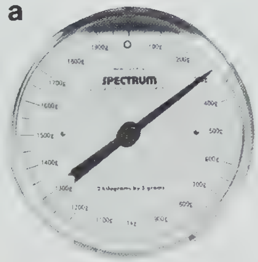
l a stove?

m a bag of candy?

n a desk?

1. Tell if each sentence is true or false.
   - **a** A letter you get in the mail weighs at least 1 kilogram.
   - **b** A thousand grams of potatoes weighs less than a kilogram of potatoes.
   - **c** You usually buy milk by the litre.
   - **d** A kilogram of feathers weighs less than a kilogram of chicken.
   - **e** The doctor might say you should take a kilogram of medicine 3 times a day.
2. What weight is shown on each scale?

a



This scale measures grams and kilograms.

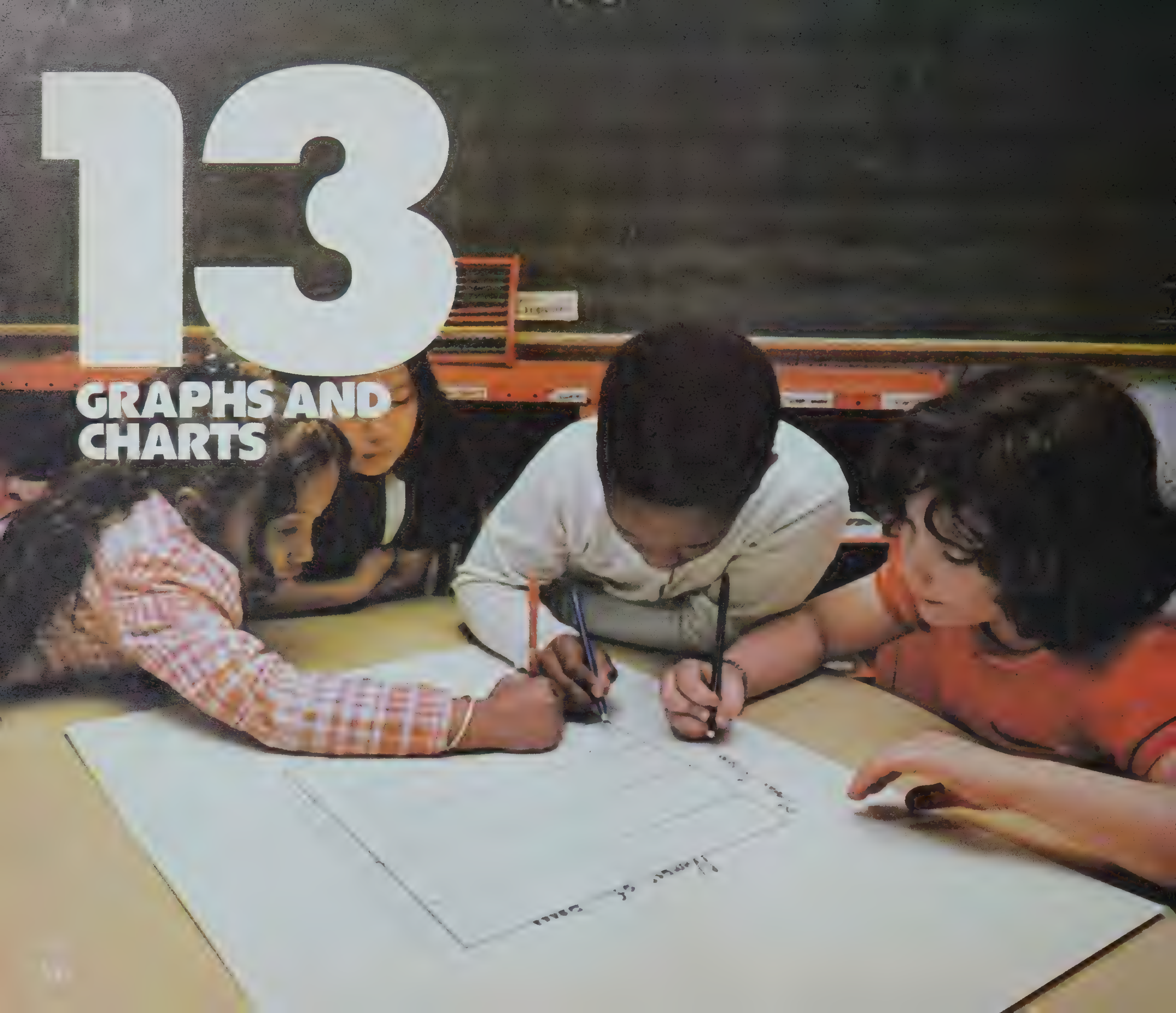
b

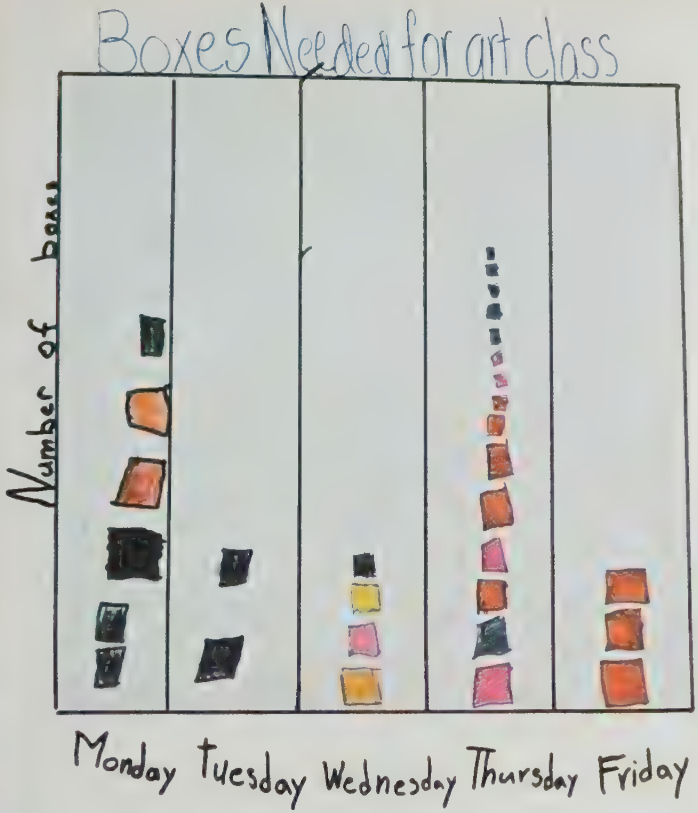
This scale measures grams.

c

This scale measures kilograms.

13 GRAPHS AND CHARTS



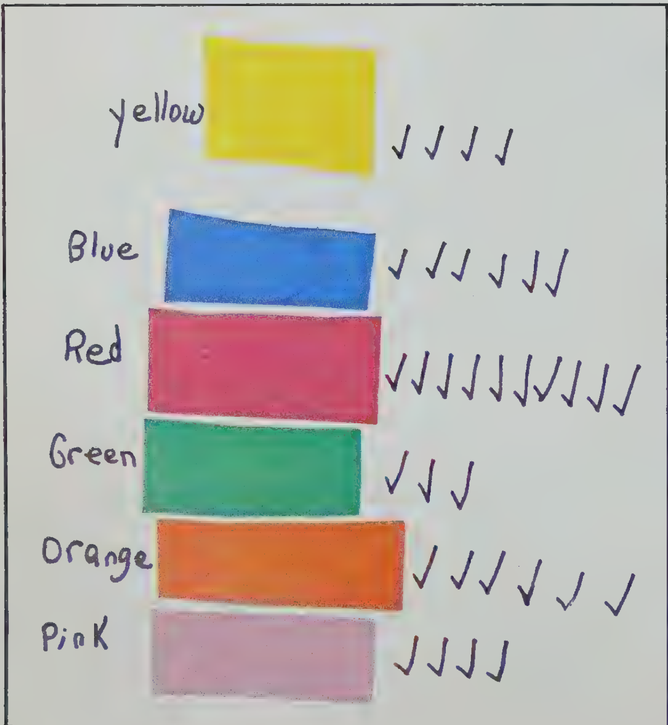


This is a special kind of picture.
It tells a story without many words.
What story could the picture tell?

Information organized in this kind of picture is called a graph. Try to find graphs in newspapers or magazines. Ask if you can bring them to class. Your goal—find out what graphs and charts tell you.

There are many ways you can put information together without using many words.

Jake's class wanted to know what the favorite color was in the class. They decided to pick from six colors. They listed the colors on a sheet of paper. Each person picked one favorite color and put a check mark by that color. Here's the finished list.



1. There were 33 people in class. Did everyone pick one color? How do you know?

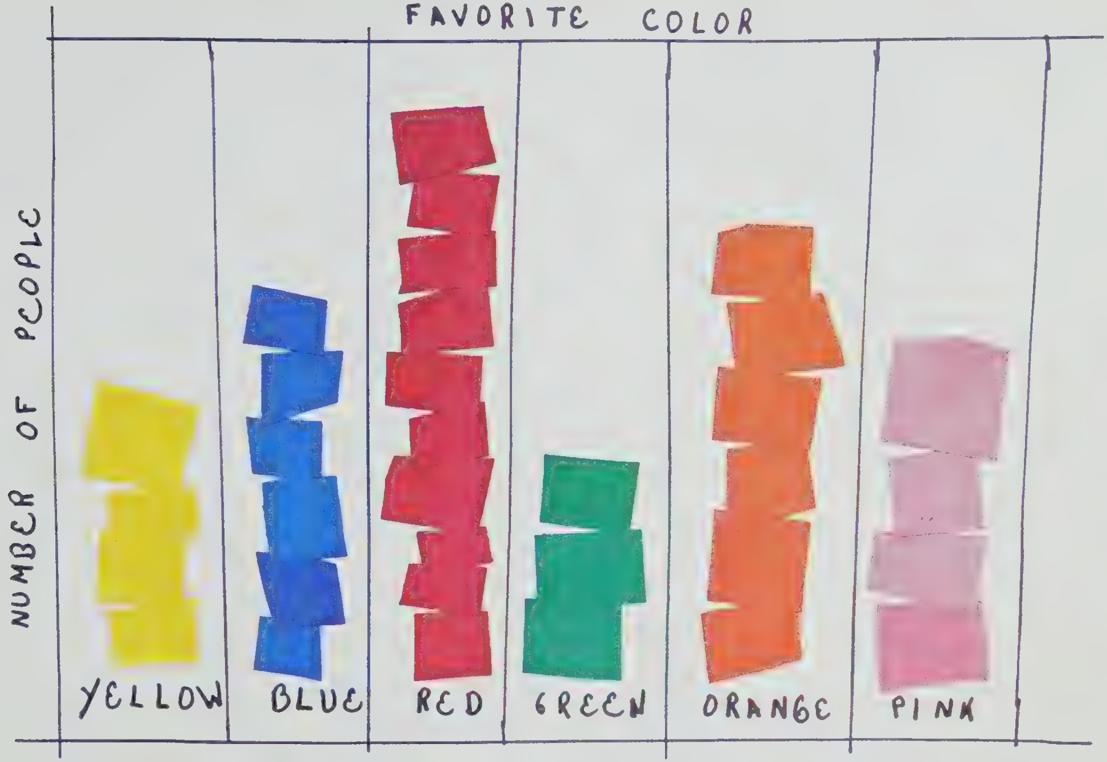
2. What color did most people like? How do you know?

3. What was the next favorite color? How do you know?

4. What was the color the least number of people liked?

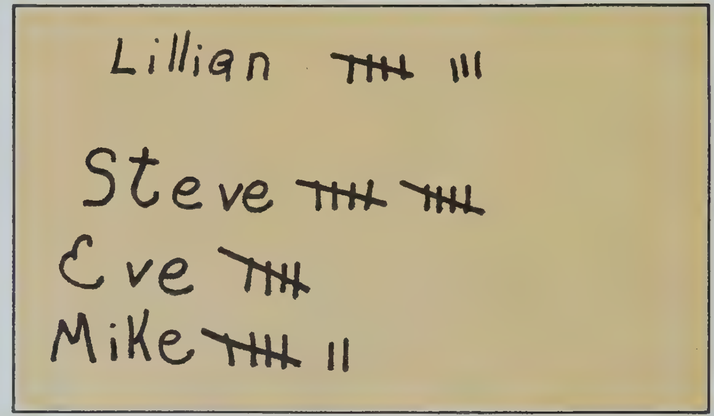
5. Do you think most people in your class would like red? Find out.
   - **a** Prepare a list of colors to pick from
   - **b** Pass the list around the class and have every person pick one color.
   - **c** Make sure everyone has picked one color, and then report the results.

Jake's class decided to make a graph of the results.
They found a piece of paper and made this graph.



1. One square stands for one person's choice.
   - **a** What other information is on the graph?
   - **b** Does this graph quickly show the favorite color?
   - **c** Make a graph to show the favorite colors picked by your class.
2. Have you found any graphs that look something like this? If so, what information is on the graph you found?

Four people in David's class had each finished a really good science project. The class wanted one of the four to tell the principal about the projects. The class voted to see who that one person should be. Each person wrote the name of one of the four people on a slip of paper and brought it to the teacher to be counted. The teacher asked David to keep count of the votes. Here is David's chart:



1. How many votes does 𝍸 stand for?

2. How many votes were counted in all?

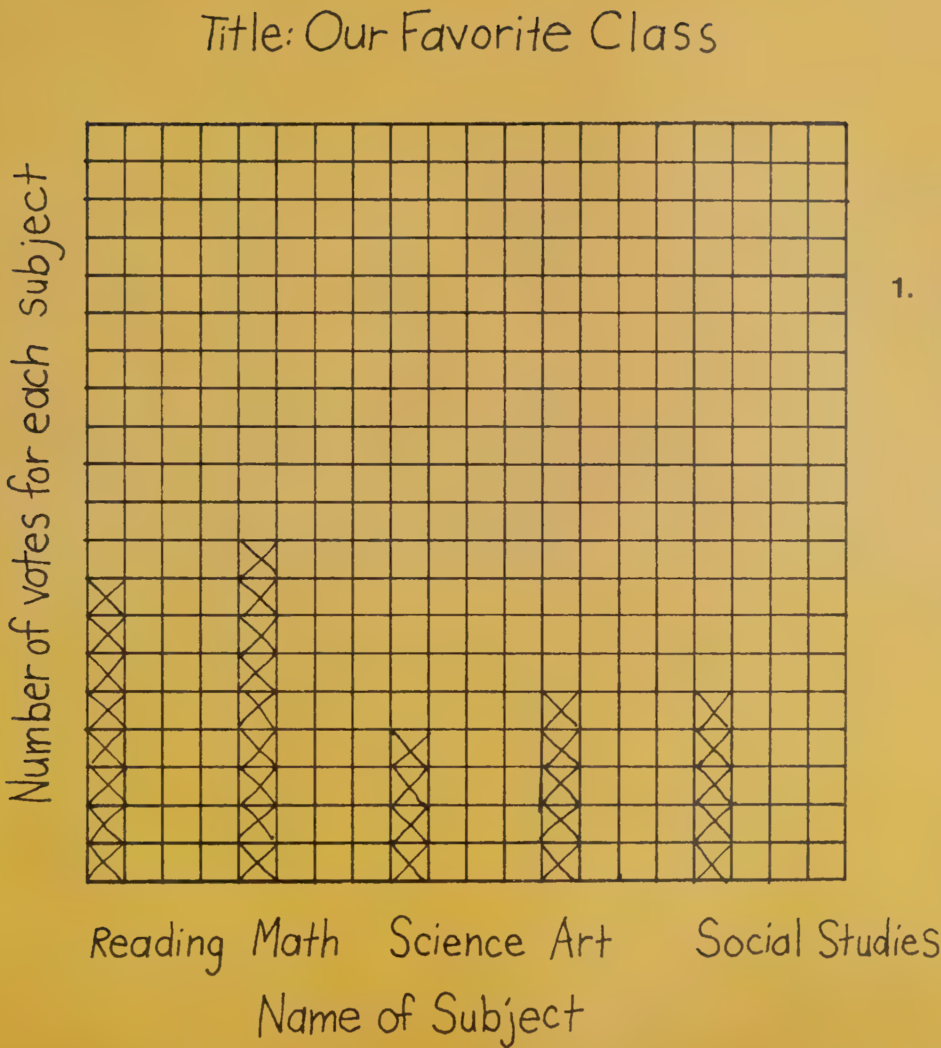
3. Who was selected to present the projects to the principal?

4. If that person happens to be out of school the day of the presentation, then who should do it?

150

The chart that David made is called a tally chart. Each single vote was recorded. The class had a tally of the total number of votes.

5. Have your class vote on their favorite subject in school. Each person should write down his favorite subject on a sheet of paper. Collect the sheets. Your teacher will read the votes while you make a tally chart of the results.



1. Make a graph like the one on this page. Show the favorite subjects of your class.

   a Make sure you have a title for your graph.

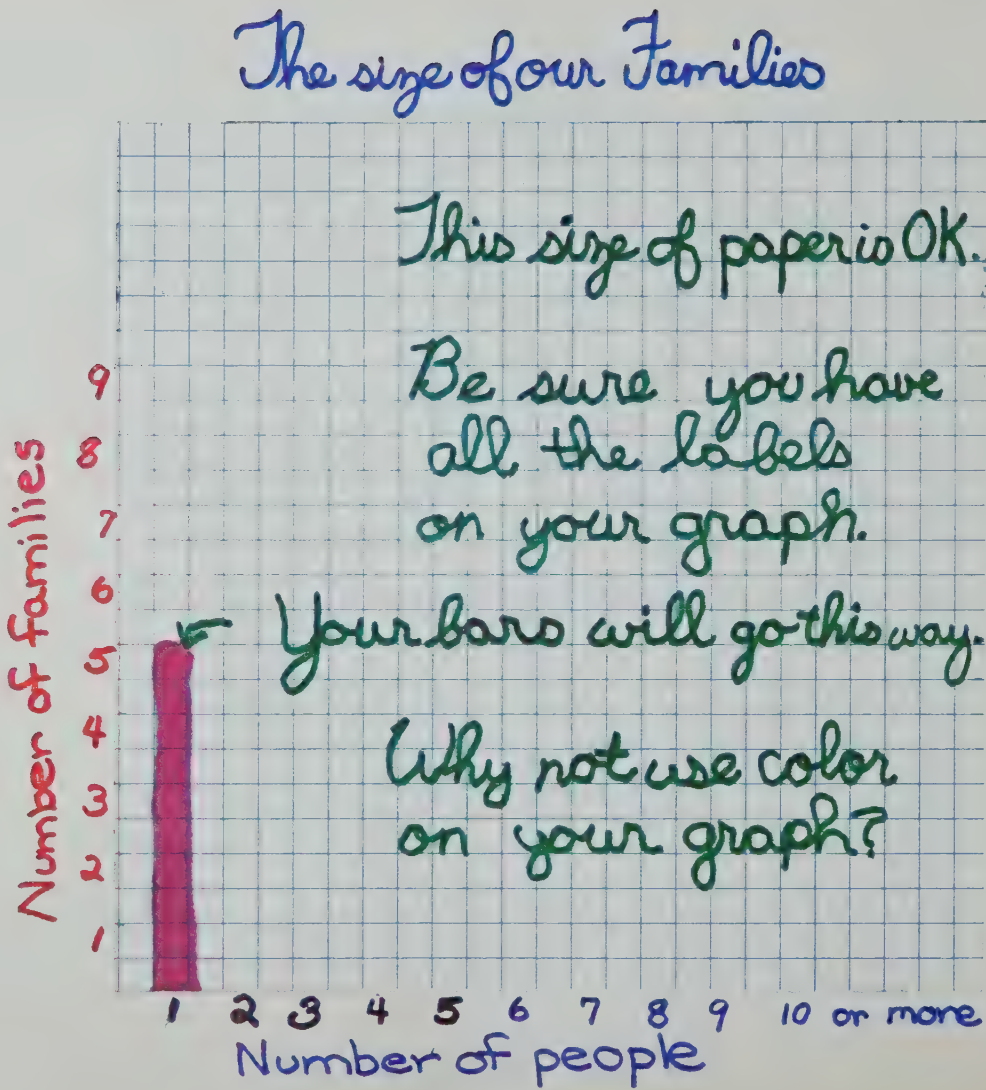
   b Write the name of the subjects along the bottom of your graph.

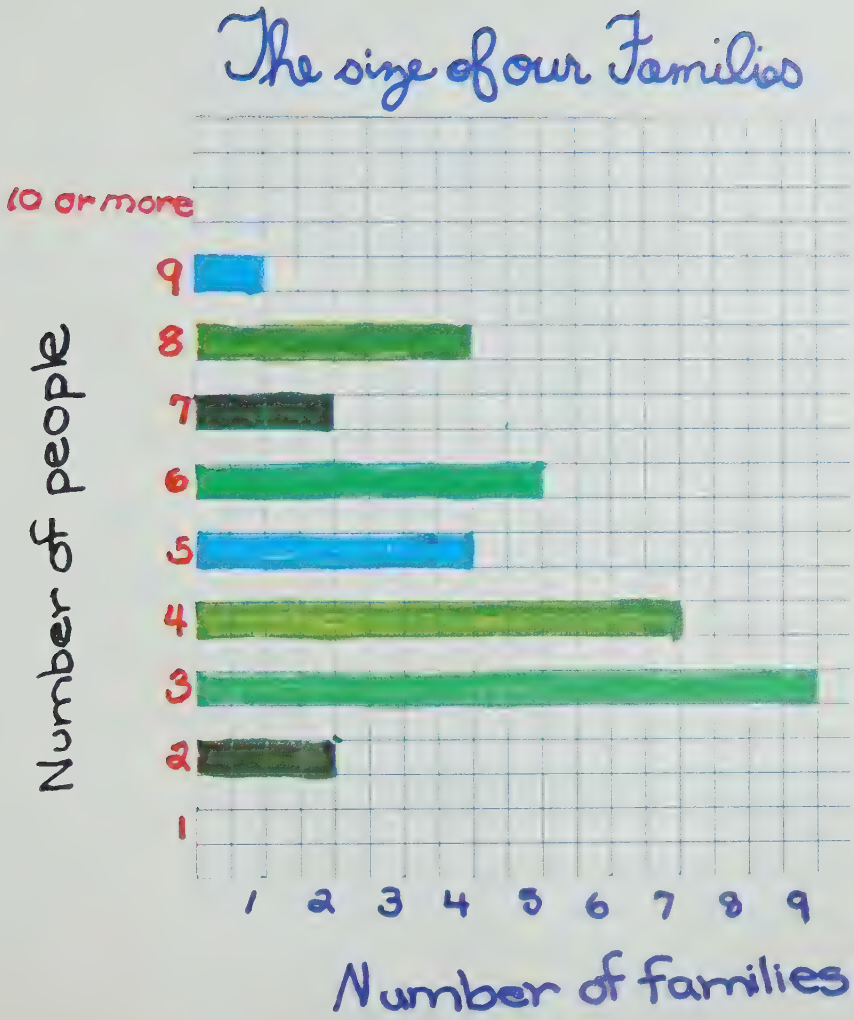
   c Let one square stand for each vote. A count of all of the squares marked should be the same as the number of tally marks.

How many people in your class have big families? How many have small families? Could you make a graph to show how many families there are of each size?

First you have to decide what a family is. No fair counting your cat or dog —only people! Don't forget to count YOU.

Then you have to tally information for the whole class. Finally, you make your graph. Be sure to use all the labels that are on the sample graph.



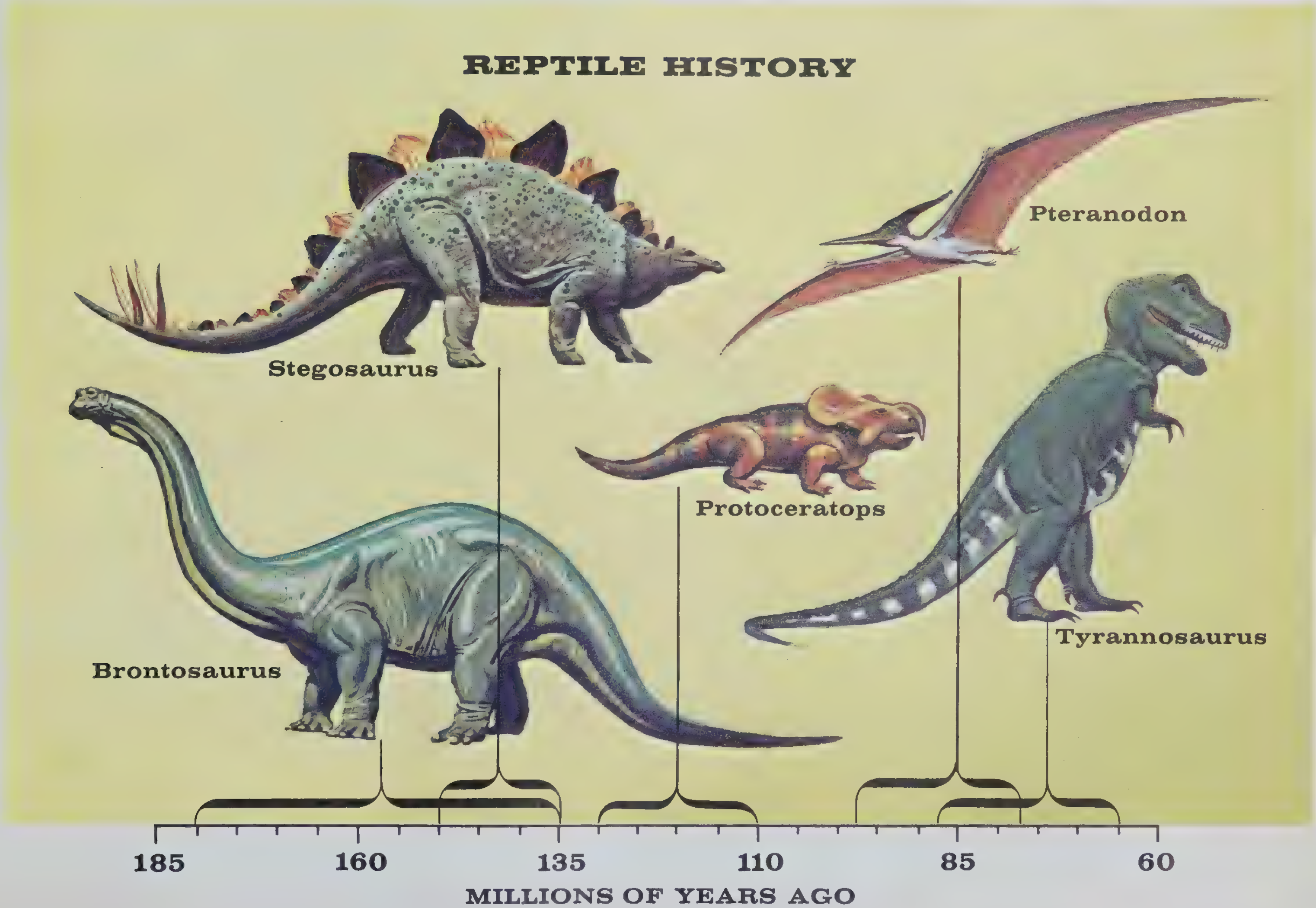


Sometimes you will see a graph like the one you just made turned sideways. Here is the graph of family size for Phil's class.

1. How is this graph like your graph?
2. How is it different from your graph?
3. Would the numbers on the left side have to go up to 10?
4. Does your graph tell the story better than this graph?

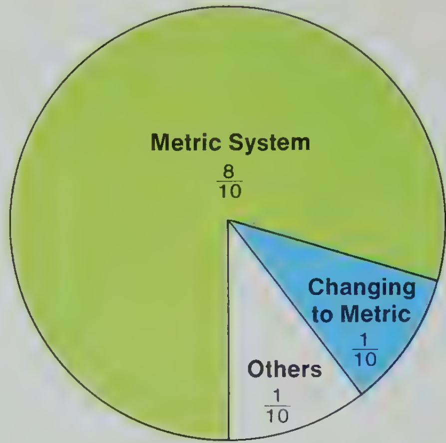
Sometimes pictures are used instead of marked squares.
What information does this graph give?

Sometimes pictures are put on a graph to give information.
Does the picture help you understand what this graph is all about?



Maybe you have found graphs that look like this:

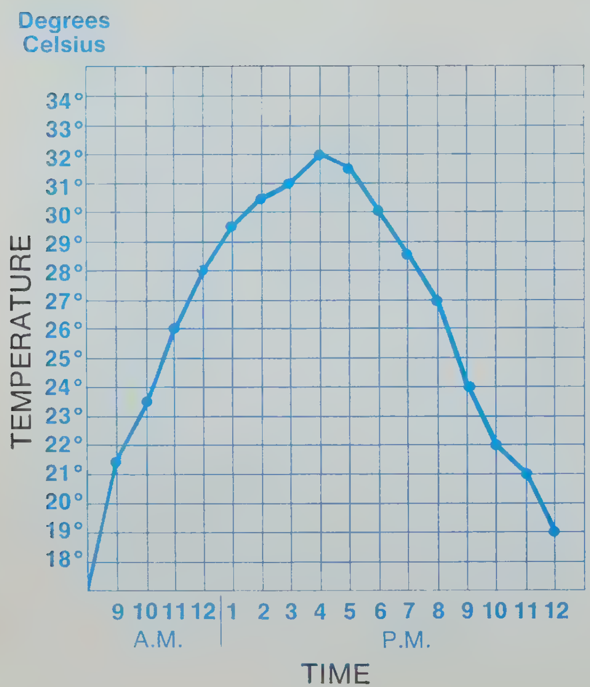
PEOPLE OF THE WORLD



Eight-tenths of the people in the world live in countries using the metric system.

One-tenth live in countries that are changing to the metric system.

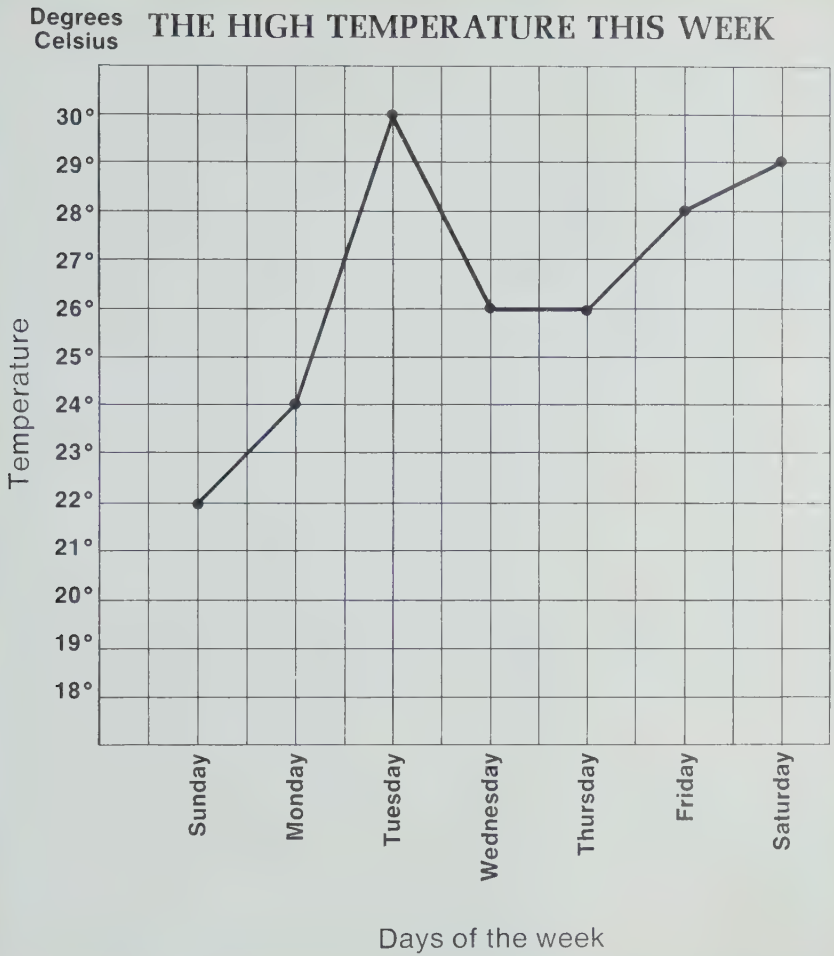
What information does this graph tell you?



This graph looks different too.

What information can you get from this graph?

What should the title of the graph be?



1. Here is another graph about temperature. What does this one tell about?

2. Read the graph.
   Answer the questions.

   a What was the temperature on Sunday?

   b Monday?

   c Tuesday?

   d Wednesday?

   e Thursday?

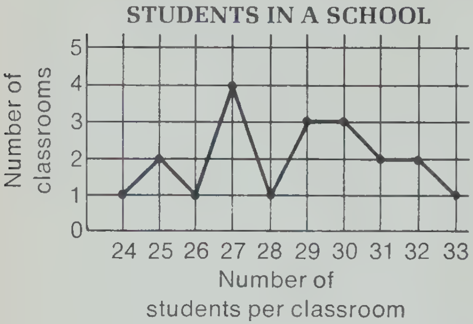
   f Friday?

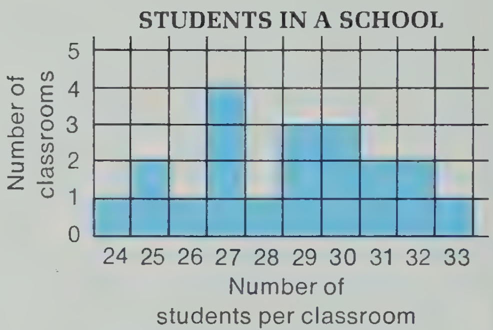
   g Saturday?

   h What was the hottest day of the week?

   i What was the coolest day of the week?

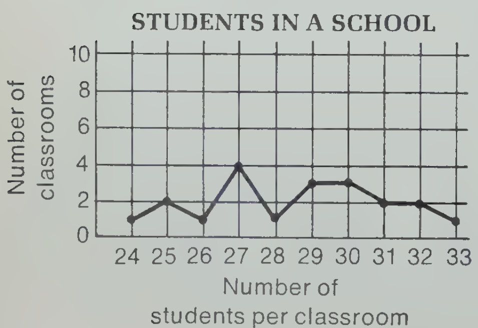
1. How are these two graphs alike? How are they different?





Could this information be put in the form of a circle graph?

2. The column of numbers along the side of a graph and the row of numbers along the bottom of a graph are very important. Why don't the numbers along the bottom of these two graphs start at zero?



3. Does this graph give the same information as the two above? How?

You have been collecting pictured information from newspapers and magazines. Sort out your collection. Be ready to talk about these questions.

1. Some graphs like those you have made are called bar graphs. Why do you think they have that name? Do you have any bar graphs in your collection? What information is presented in each bar graph you have?

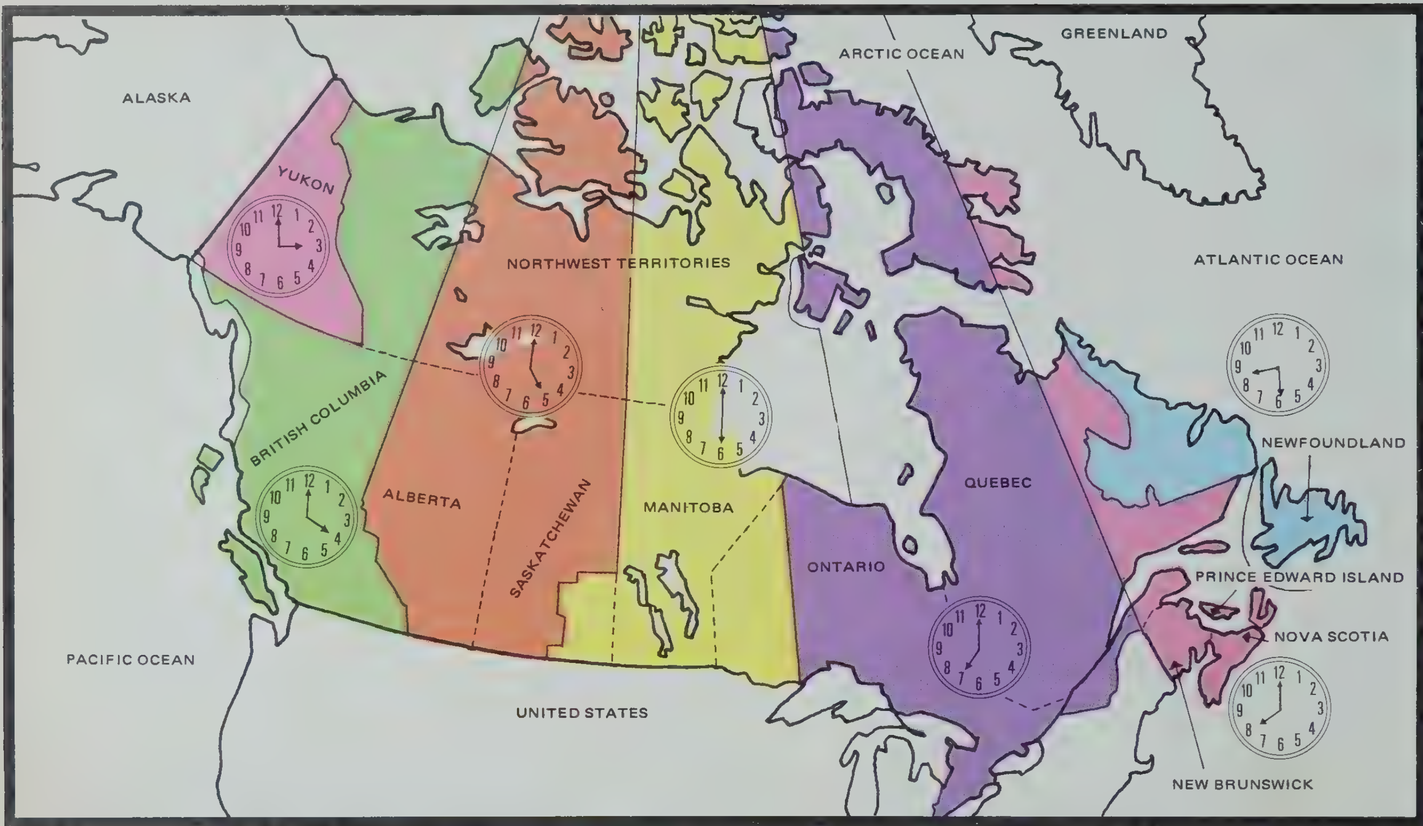
2. You also looked at some graphs called pictographs. Can you look back and find the kind of graph that might have a name like this? Where could the name come from? Do you have any pictographs in your collection?

3. You know why the name circle graph is given to some graphs. Can you find an example of a circle graph in this chapter? Do you have any circle graphs in your collection?

4. There are many other kinds of graphs. If you have some other kinds in your collection, give them a name. Be ready to explain why you picked the name you did.

5. Some graphs are easier to understand than others. Pick out your favorite one. Tell why you think it is the best one.

What information can you get from this picture?



1. When it is 1.00 in the Yukon Territory, what time is it in British Columbia?
2. When it is 6.30 in Newfoundland, what time is it in Alberta?
3. When it is 7.00 in western Ontario, what time is it in Manitoba?
4. When it is midnight in New Brunswick, what time is it in Nova Scotia? in eastern Quebec? in Prince Edward Island? in Saskatchewan?

Tally charts and graphs are not the only ways to picture information. What does this chart show?

ROAD DISTANCES BETWEEN CITIES IN CANADA MEASURED IN KILOMETRES

	Edmonton	Fredericton	Halifax	Ottawa	Quebec	Regina	Toronto	Vancouver	Winnipeg
Edmonton	—	4675	5197	3621	4086	818	3539	1562	1388
Fredericton	4675	—	530	1055	589	3850	1418	5878	3280
Halifax	5197	530	—	1652	1222	4379	1948	6408	3809
Ottawa	3621	1055	1652	—	465	2803	417	4822	2228
Quebec	4086	589	1222	465	—	3268	829	5289	2698
Regina	818	3850	4379	2803	3268	—	2715	2022	570
Toronto	3539	1418	1948	417	829	2715	—	4806	2151
Vancouver	1562	5878	6408	4822	5289	2022	4806	—	2589
Winnipeg	1388	3280	3809	2228	2698	570	2151	2589	—

Plan a trip to go to three cities on this chart.
Tell the total number of kilometres you would travel from the first city to the third city.

Just for fun

The government keeps many records.
The heights and weights of thousands of schoolchildren are recorded. These facts tell what the average person weighs if he is a certain height. Look at and think about the charts on the next page.

1. The charts start with boys and girls who are ten years old. Why do you think ages younger than ten are not on the charts?

2. If a boy and a girl are the same age and same height, should their weight also be the same?

3. What happens to the average weight when the height increases?

4. If two boys are the same height but different ages, are the weights the same?

5. Why do you think the first height for boys in the chart is 29 centimetres and the first height for girls is 25 centimetres? Are boys always taller than girls?

6. Does the chart say that a ten-year-old boy must be 29 centimetres tall? Can a ten-year-old girl be less than 25 centimetres tall?

7. What happens to average height as boys and girls get older? What happens to average weight as they get older?

BOYS between 10 and 16 years
in school clothes, without shoes

HEIGHT (in centimetres)	AVERAGE WEIGHT in kilograms for each specified age and height					
	10-11 yrs.	11-12 yrs.	12-13 yrs.	13-14 yrs.	14-15 yrs.	15-16 yrs.
132	29	29	29	—	—	—
135	30	31	31	—	—	—
137	32	32	32	33	—	—
140	33	34	34	34	—	—
142	35	35	35	35	36	—
145	37	37	37	38	38	—
147	38	39	39	39	39	—
150	40	40	40	41	41	41
152	42	42	42	43	43	44
155	43	44	44	45	45	47
157	45	46	46	47	47	49
160	48	48	49	49	50	51
163	—	49	50	51	52	53
165	—	52	53	54	54	55
168	—	—	54	55	57	58
170	—	—	56	58	59	61
173	—	—	—	61	61	62
175	—	—	—	62	63	65
178	—	—	—	65	65	66
180	—	—	—	67	68	68
183	—	—	—	—	69	70

GIRLS between 10 and 16 years
in school clothes, without shoes

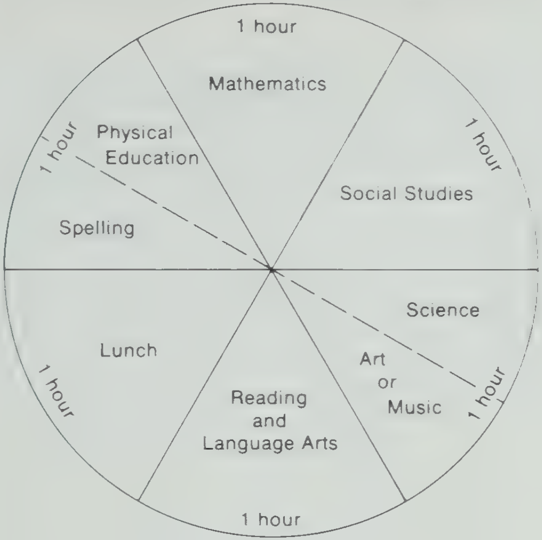
HEIGHT (in centimetres)	AVERAGE WEIGHT in kilograms for each specified age and height					
	10-11 yrs.	11-12 yrs.	12-13 yrs.	13-14 yrs.	14-15 yrs.	15-16 yrs.
124	25	—	—	—	—	—
127	28	28	—	—	—	—
130	29	29	—	—	—	—
132	29	30	—	—	—	—
135	31	31	32	—	—	—
137	32	32	33	—	—	—
140	34	34	35	35	—	—
142	35	36	37	38	—	—
145	37	37	38	40	42	—
147	39	39	40	42	44	46
150	41	41	42	44	45	47
152	43	43	44	46	48	49
155	45	45	46	48	49	51
157	47	48	48	49	51	52
160	—	50	50	51	53	53
163	—	52	52	53	54	54
165	—	54	54	55	55	56
168	—	—	56	56	57	58
170	—	—	58	59	59	60
173	—	—	59	60	61	62
175	—	—	—	61	62	63

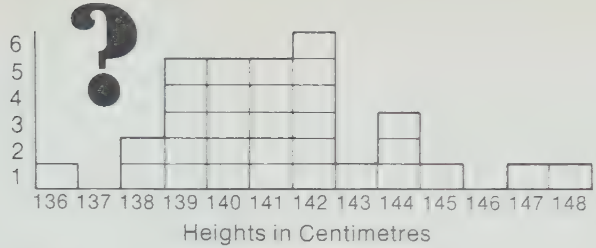
Here is a type of chart you probably see every day.

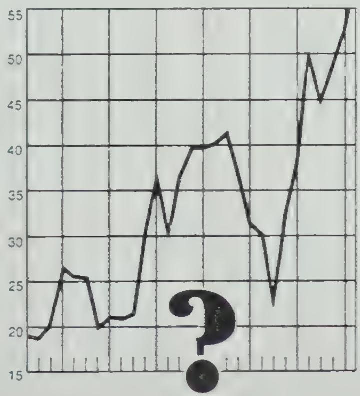
1999			DECEMBER			1999
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1. What month is shown on this calendar?
2. What year is shown?
3. This month calendar could be any month except September, April, June, November, or February. Why couldn't it be one of those months?
4. This is what the month of December 1999 will look like.
   - **a** The first of December 1999 will come on what day?
   - **b** What is the date of the first Monday in December?
   - **c** Christmas is on the twenty-fifth of December. What day will Christmas be on in 1999?
   - **d** What day will be the first day of 2000?
   - **e** How many Wednesdays in this December? How many Sundays? How many Saturdays?
   - **f** Could any month of any year have more than five Wednesdays or Sundays or Saturdays? Why?

Time Spent in School from 9:00 A.M. Through 3:00 P.M.







To think and talk about

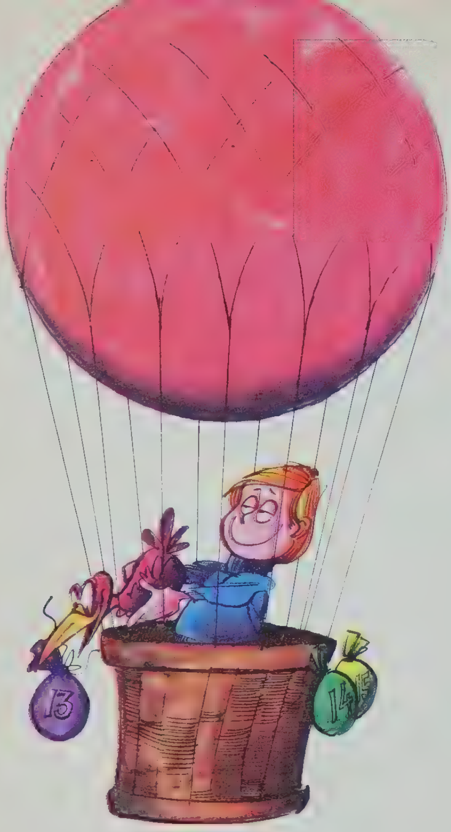
1. Do you think that you could get fooled about information presented in a graph? How?

2. Why are there so many different kinds of graphs?

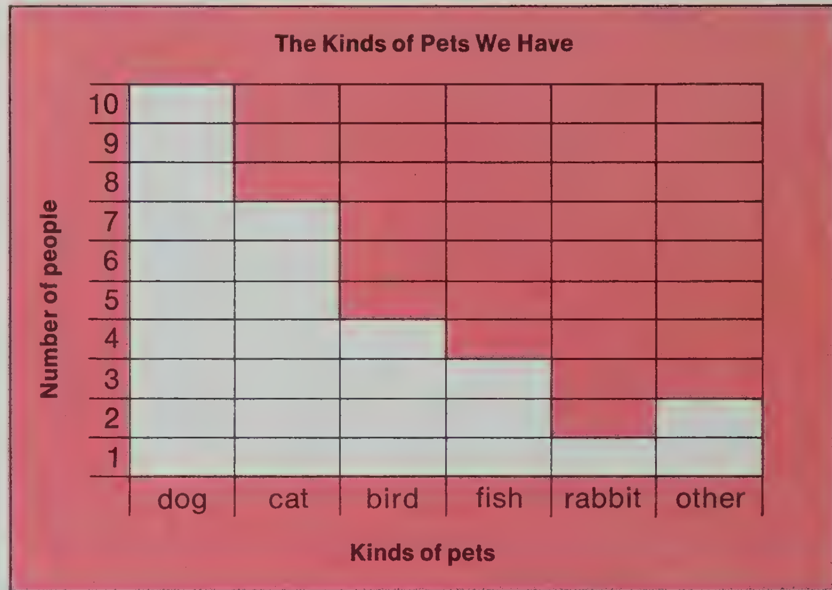
3. What kind of information have you found that is presented in graph form?

4. Why are calendars found in just about every home, school, and business place?

Keep your eyes open. Watch for graphs and charts. Read those you use carefully. Don't get fooled by them.



CHECKOUT



1. Look at the graph. Then answer these questions.
   - **a** Does the graph tell how many dogs in all?
   - **b** Does the graph tell how many people have dogs?
   - **c** Tell how many people have fish.
   - **d** Tell how many people have rabbits.
   - **e** Tell how many people have other kinds of pets.
   - **f** What do you think the other pets might be?

14 MEASUREMENT

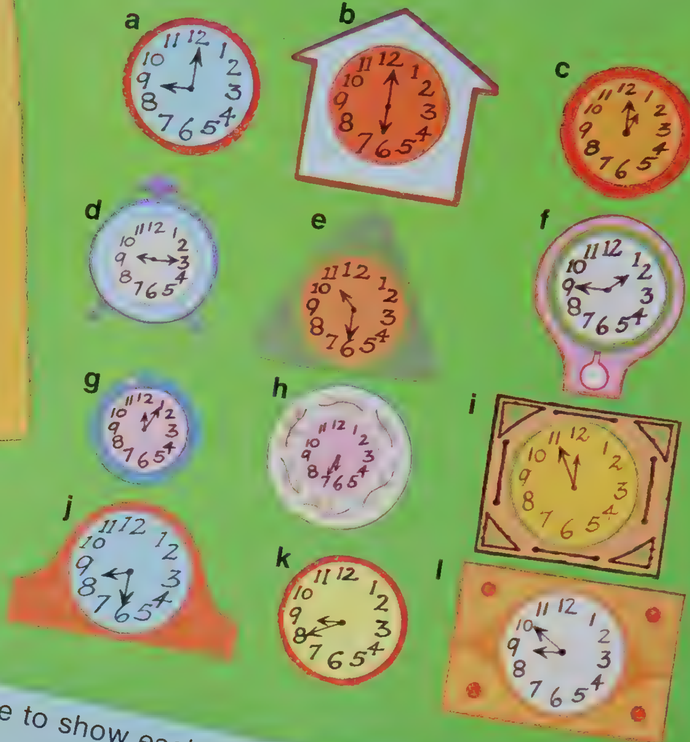
You have learned more about numbers.

Now

YOUR GOAL

is to learn more about measurement.

1. What time does each clock show?



2. You draw a clockface to show each time.

a 12:00

b 12:05

c 1:00

d 11:30

e 11:35

f The time school is out.

There are—
60 minutes in 1 hour,
15 minutes in a quarter of an hour,
30 minutes in a half hour, and
45 minutes in three-quarters of an hour.

We say this clock
shows four o'clock.
We write 4:00.

Say—
15 minutes after 4
or a quarter after 4.

Write—4:15

LOOK OUT!

Say—
30 minutes after 4
or half past 4.

Write—4:30

Say—
15 minutes to 5
or a quarter to 5.

Write—4:45

The clock shows 12 hours. There are 24 hours in 1 day, so the hour hand on the clock goes all the way round 2 times in one day.

Is it 2:00 in
the morning or
in the afternoon?

People are coming to see you. They said to meet them at 10:00. Do you have to know more about the time? What?

Please use the abbreviation A.M. to say that a time is after 12:00 midnight but before 12:00 noon. Use P.M. to say the time is after 12:00 noon but before 12:00 midnight.

1. How many minutes from—

a	9:00 to 9:30?	b	9:00 to 9:15?
c	9:15 to 9:30?	d	10:00 to 10:45?
e	10:45 to 11:00?	f	1:20 to 1:30?
g	3:30 to 3:45?	h	11:55 to 12:00?
i	12:00 to 1:00?	j	1:05 to 2:00?

2. The train was to arrive at 10:00 A.M. It got there at 10:10 A.M. How many minutes late was it?

3. He was to start work at 8:30 A.M. He started at 8:45 A.M. How many minutes was he late?

4. The appointment was for 3:20 P.M. He got there at 3:10 P.M. How many minutes early was he?

5. The bus left at 8:05 A.M. The trip took 20 minutes. What time did the bus get there?

6. The shop closed at 11:30 for lunch. Lunchtime is 1 hour. What time does the shop open?

7. Write the time when it is—

   a 5 minutes before 4:00

   b 30 minutes before noon

   c 15 minutes before 9:00

   d 20 minutes before 2:00

He had to be in bed by 8:30 P.M. The clock said it was 7:45. How many minutes before he went to bed?

Think from 7:45 to 8:00 is 15 minutes.
from 8:00 to 8:30 is 30 minutes.
Add 45 minutes in all.

1. Find out how many minutes there are from 11:55 A.M. to 12:05 P.M.

Think from 11:55 to 12:00 is 5 minutes.
from 12:00 to 12:05 is 5 minutes.
Add ? minutes in all.

2. Find out how many minutes—

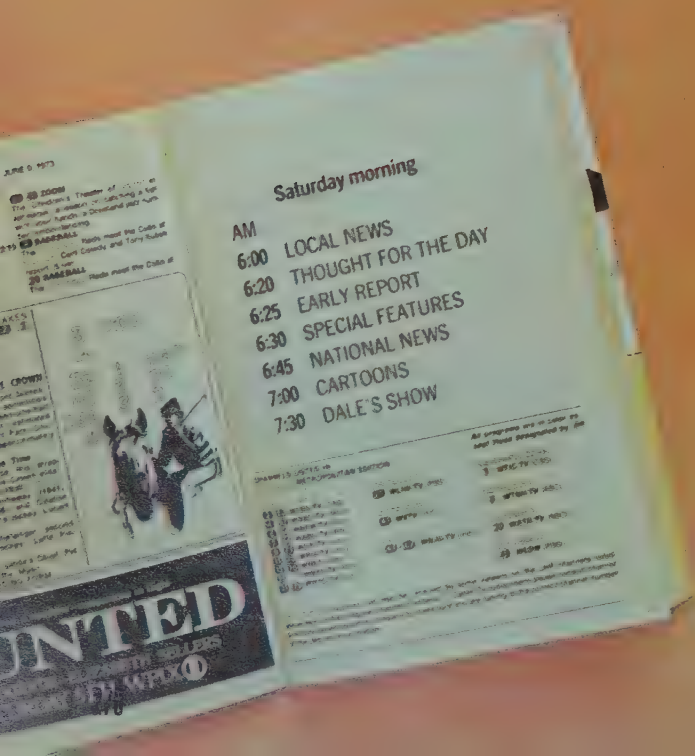
	From	To		From	To
a	2:30	3:10	**b**	6:45	7:15
c	5:30	6:15	**d**	11:20	12:15
e	9:15	10:15	**f**	3:00	4:30
g	8:15	8:55	**h**	4:35	5:10
i	1:25	1:55	**j**	2:20	3:35
k	4:40	5:05	**l**	7:55	8:10

3. The meat was to cook for $2\frac{1}{2}$ hours. It was started at 5:00. What time will it be done?

4. The music lesson started at 4:45. It lasted 45 minutes. What time was it over?

5. I was supposed to meet you at half past six. You waited until a quarter to seven and left. How long did you wait?

Saturday morning's TV listing looks like this:


Saturday morning

AM
6:00 LOCAL NEWS
6:20 THOUGHT FOR THE DAY
6:25 EARLY REPORT
6:30 SPECIAL FEATURES
6:45 NATIONAL NEWS
7:00 CARTOONS
7:30 DALE'S SHOW

1. How many minutes for—
   a local news?
   b "Early Report"?
   c special features?
   d cartoons?
   e "Dale's Show"?

2. Which is the longest program in the listing?

3. Which is the shortest program? Look carefully!

4. Let's say "Dale's Show" lasts 2 hours. When would it be over?

5. Make a chart to show how much time you watch TV in the next three days. Make the chart any way you want to. But make sure it shows the day and the amount of time.

Many people travel by train every day. There is a schedule that shows what time the train *leaves* a certain place. The schedule also shows what time it *arrives* at a certain place.

Leave city A	Arrive city B	Arrive city C
A.M.	A.M.	A.M.
8:05	8:50	9:25
10:35	11:15	11:50
P.M.	P.M.	P.M.
12:35	1:15	1:50
3:35	4:15	4:50
5:10	5:55	6:30
7:35	8:16	8:50

Here is part of a train schedule.
Look at it.
What does it tell you?

1. If you leave city A at 8:05 A.M., when do you get to city B? to city C?
2. If you leave city A at 12:35 P.M., when do you get to city B? to city C?
3. It is afternoon. You are in city A. Your watch says → When is the next train to city C?
4. If you leave city A at 8:05 A.M., how many minutes before you can be in city B?
5. If you leave city A at 5:10, how many minutes before you can be in city C?
6. Could you go from city B to city C on this train?

1. You left the house at 4:30. You had $1.00 to buy 1 package of hamburger at the store. You got back at 4:45. You bought the hamburger. You have $.21 change.

   a How long were you gone?

   b How much money did you spend?

2. You were going to a movie one Saturday afternoon. You had $2.00. You left at 2:00. You had $.50 when you got home at 5:00.

   a How long were you gone?

   b How much money did you spend?

3. You and your brother were going to visit your friend one morning. You have $1.50 and an O.K. to buy one thing. You leave at 9:00. You get home at noon. You have $.15 left.

   a How long were you gone?

   b How much money did you spend?

4. You left for the hobby store at 4:15. You were supposed to be home in half an hour. You got what you wanted. It cost $.69. You got home at 5:00.

   a Were you late? How do you know?

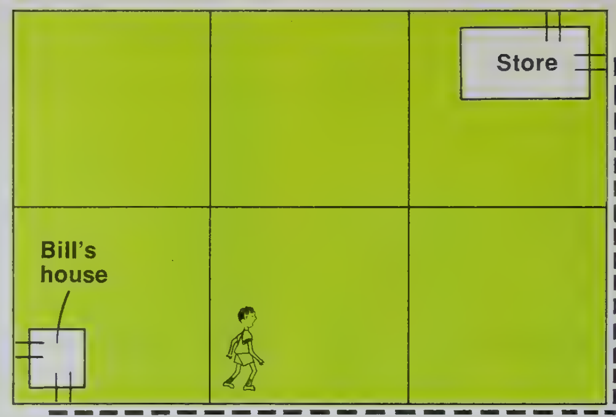
   b How much change did you have left from $1.00?

5. Your turn to make up a problem like the ones on this page. Make it real if you can.

1. Bob bought
   1 malt
   1 hotdog
   How much did they cost?
2. Eve bought
   1 hamburger
   1 french fries
   How much did they cost?
3. Al bought
   2 hotdogs
   1 root beer
   How much did they cost?
4. Lyn bought
   2 apples
   2 oranges
   How much did they cost?
5. Big Bill bought
   2 hamburgers
   1 french fries
   1 malt
   How much did they cost?
6. Little Lill bought
   2 hotdogs
   2 ice-cream cups
   1 milk
   How much did they cost?
7. What would you buy if you were going to have lunch? How much would the food cost that you plan to buy?

1. Bill often went to the store. He didn't mind going. He liked to take a different way as often as he could. Here is a map of where he lives. It also shows the store. Each large square shows one square block.

   The dotted line shows one path he can walk to the store. How many blocks would he walk on this path? Could he walk another path?



2. Copy this map on your paper.

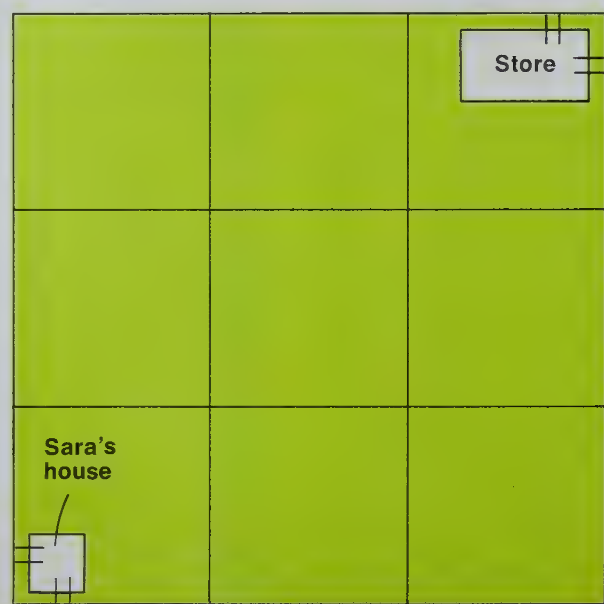
   a Mark the other paths that he could walk. The rules are that he must walk on the sidewalk. No cutting across a block.

   b Is one path you found shorter than any other?

3. Here's another map. This shows where Sara lives. Does she live farther away from the store than Bill?

   a Sara always rides her bike to the store. You know she can't cut across lawns. Copy the map on your paper. Show the paths that Sara could take.

   b Is one path shorter than any other?



4. Draw a map of where you live. Show your path to a place you often go—to school, to a store, to a playground, or to a friend's house.

Talk about this page.

Pretend you have to go to the store.
You have to buy milk.

What units are used to measure a liquid?

1. Make a list of all the liquids you can think of that you might buy. Tell which unit of measure would be best to describe each one.
2. Can a litre of milk fit into another container that is a different shape?
3. Can a litre of paint fit into another container that is a different shape?

1000 ml = 1 litre

Two 500 ml containers hold the same amount as 1 litre container.

And four 250 ml containers hold the same amount as 1 litre container.

And two 250 ml containers hold the same amount as a 500 ml container.

1. One day when Bill went to the grocery store he had trouble. The things he was supposed to buy were on a list.
He looked and looked, but it didn't help.
   a The bottle of cooking oil said 1000 ml. Should he buy it?
   b There were no one-litre cartons of milk left. There were only 500 ml cartons. What should he do?
   c The rice was in 500 gram packages. How many should he buy?
   d The whipping cream was in 250 ml containers. How many should he buy?

1 litre cooking oil
1 litre milk
1 kilogram rice
500 ml whipping cream

2. Sara had to get some things from the department store. She had a list too. And she had trouble too!
She looked and looked, but it didn't help.
   a The package of red trim said 100 cm. Should she buy it?
   b There was 1 metre of red cloth left. Would this be enough? Should she buy it?
   c There was a one-metre spool of blue ribbon. What should she do?

1 metre red trim
at least 120 cm red cloth
at least 90 cm blue ribbon

Do you ever have problems like this when you go shopping?

1. 1 kilogram = 1000 grams

a 2 kilograms = ? grams

b 3 kilograms = ? grams

2. 1 kilometre = 1000 metres

a 2 kilometres = ? metres

b 3 kilometres = ? metres

3. 1 litre = 1000 millilitres

a 2 litres = ? millilitres

b 3 litres = ? millilitres

4. 1 metre = 100 centimetres

a 2 metres = ? centimetres

b 3 metres = ? centimetres

5. There was a race.
Snor and Snik Snail were off and running.

Snor went 1 centimetre. Then he rested. He raced another 2 centimetres and then stopped. Finally, he went 1 more centimetre before the time for the race was over.

Snik went 2 centimetres before he rested and then 2 more centimetres. He was tired. He went 1 more centimetre before the race had ended.

a Who went the greater distance?

b How much farther did the winner go?

6. A bird's nest was 7 metres up in a tree. The top of the tree was 3 metres above the nest. How high was the tree?

You can add measurements.

3 metres
+4 metres
7 metres

Total Units of Measure

Try these

1. 4 centimetres
+ 6 centimetres

2. 3 metres
+ 6 metres

3. 4 litres
+ 7 litres

4. 50 centimetres
+ 30 centimetres

5. 34 kilograms
+ 63 kilograms

6. 45 metres
+ 50 metres

7. 16 grams
+ 23 grams

8. 32 kilometres
+ 65 kilometres

9. 47 millilitres
+ 30 millilitres

Now try these

10. 9 m
+ 2 m

11. 40 ℓ
+ 16 ℓ

12. 24 ml
+ 15 ml

13. 3 kg
+ 16 kg

14. 40 km
+ 30 km

15. 16 cm
+ 22 cm

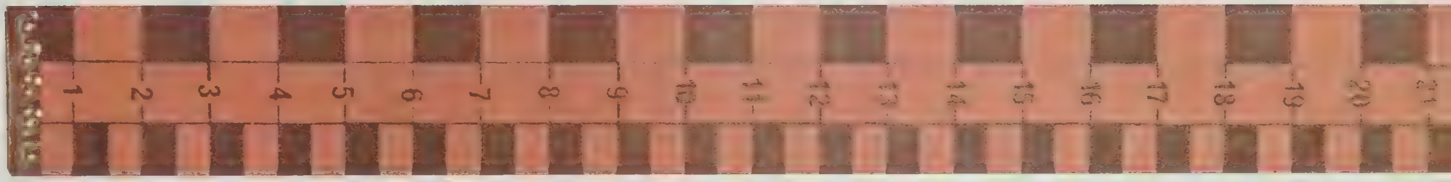
1. If a teeny, tiny ant had to walk on the black line along each of the paths below, which path would be the longest walk?

Path A 

Path B 

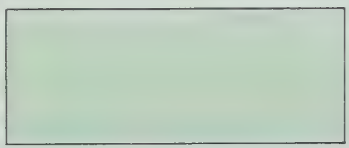
How can you check to make sure?

One way to check would be to use a ruler. If you don't have a ruler marked with centimetres, copy this one.

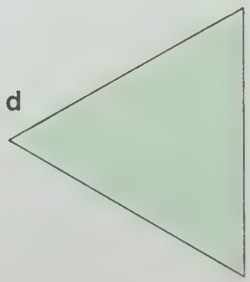


2. Let's suppose that same ant had to walk on the black lines below that form squares, rectangles, and triangles. Measure how far he would have to walk if he went all the way around each shape.

a 

b 

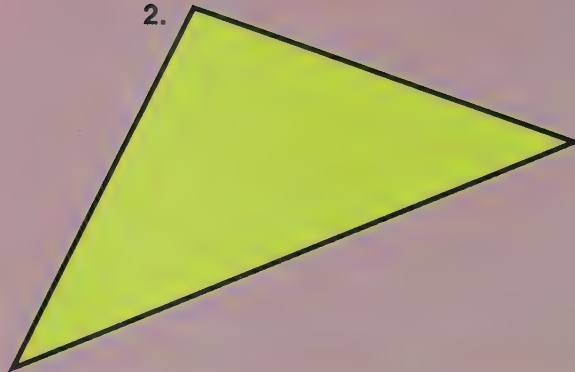
c 

d 

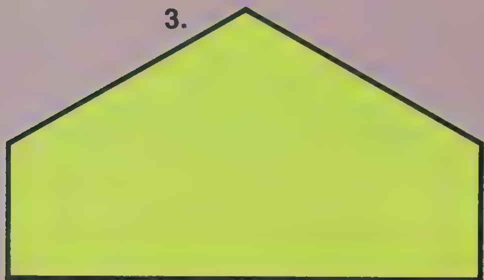
Measure the distance around
each of these figures.
Use your centimetre ruler.

1.

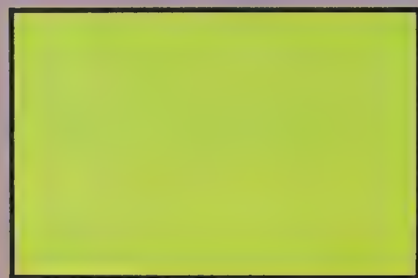
2.



3.



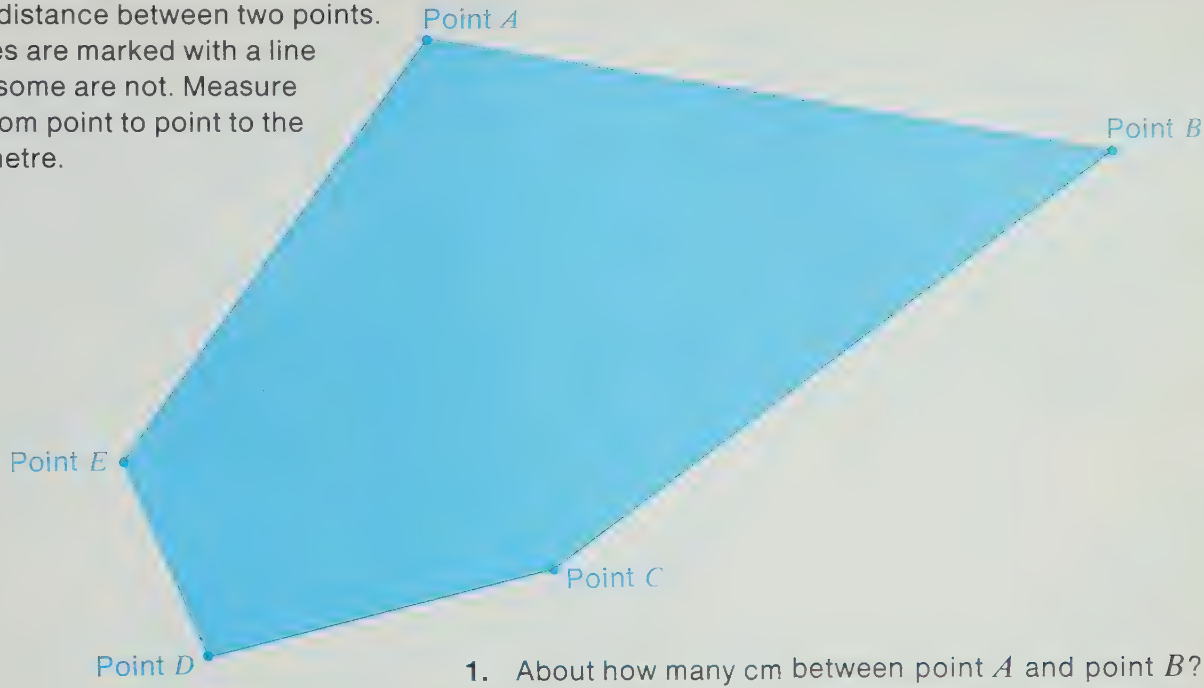
4.



5.

6.

Use your ruler marked with centimetres. You'll be finding the distance between two points. Some distances are marked with a line segment, and some are not. Measure the distance from point to point to the nearest centimetre.



1. About how many cm between point A and point B?
   between point A and point C?
   between A and D?
   A and E?

2. About how many cm between point B and point C?
   between point B and point D?
   between B and E?
   B and A?

3. About how many cm between point C and point D?
   between point C and point E?
   between C and A?
   C and B?

These figures all look different.

But they are alike in at least one way.

How are they alike? (Hint: Use your centimetre ruler.)

1 Mrs. Jay liked to walk. She lived close enough to her job so that she could walk to work. She walked 1 kilometre to work every morning. She walked 1 kilometre home every night.

a How many km did she walk every day back and forth to work?

b She worked 4 days a week. How many km did she walk back and forth to work every week?

2 Mr. Jay had to go 19 km to the place he worked. He drove a car. Every day he drove 19 km to work in the morning. He drove 19 km back home every night.

a How many km did he drive every day back and forth to work?

b He worked 5 days a week. How many km did he drive back and forth in a week?

c There are usually 4 weeks in a month. How many km did he drive back and forth in a month?

3 How far do you travel to get to school each day?

a How far do you travel back and forth each day?

b How far each week?

c How far in 1 month?

4 How many hours do you spend in school each day? How many hours in a week? in a month?

Forgetful Fred forgot more than he remembered. He was supposed to find some measurements. He wrote down each measurement on a piece of paper. But he forgot to write down the unit of measure he used. He had a scale. But he forgot whether the scale measured grams or kilograms. We know he had a yardstick and a metrestick. Of course he can't find them now. He forgot where he put them.

What standard unit of measure might be right for these measurements that Fred wrote down?

a door 2 high

b board eraser - 12 long

c pencil - 17 long

d plant - 12 high

e book - 21 wide

f my hand - 6

g Dad - 175 high

h Brother - 15 old

i me - 120 high

j me - 24 heavy

k walk home - 2

l lunch cost - 30

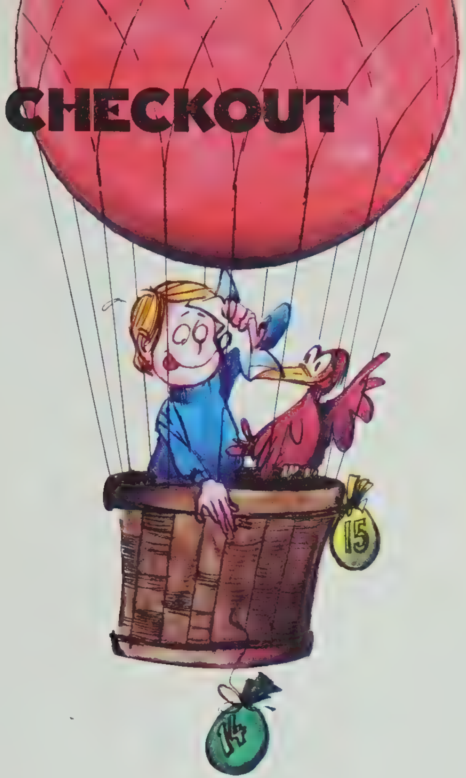
m my room - 4 long

n apple - 180 heavy

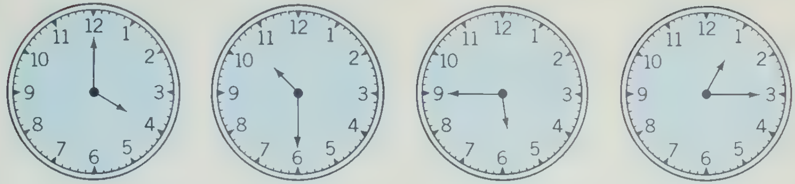
o letter - 4 heavy

p time this took me - 1

CHECKOUT



1. Write the time each clockface shows.



a b c d

2. They had to practise their music lesson for 30 minutes.
   - a Jay started at noon. When did he finish?
   - b Jan started at 4:30 P.M. When did she finish?
   - c Jake started at 6:15 P.M. When did he finish?
   - d Jill started at 6:45 P.M. When did she finish?

3. Answer these questions.
   - a 4 cm and 5 cm more.
     How many cm in all?
   - b 1 metre and 2 metres more.
     How many metres in all?
   - c 20 centimetres and 50 centimetres more.
     How many in all?
   - d 35 cents and 45 more cents.
     How many cents in all?
   - e 29 cents and 49 more cents.
     How many cents in all?

4. Measure and record the length and width of this book.

15
COMPUTATION

Your goal in this chapter is to get it all together! Find out more about addition, subtraction, multiplication, AND division.

The numbers 1, 3, 5, 7, 9, and 11 are called odd numbers. The numbers 2, 4, 6, 8, 10, and 12 are called even numbers. All numbers that end with an even number are also even.

1. Try to list the next nine odd numbers that come after 11.

2. Try to list the next eight even numbers that come after 12.

3. Add these odd numbers.

a	**b**	**c**	**d**	**e**	**f**	**g**	**h**
1	3	5	7	9	7	5	3
+ 3	+ 5	+ 7	+ 9	+ 7	+ 5	+ 3	+ 1

Are your answers odd or even numbers?

4. Add these even numbers.

a	**b**	**c**	**d**	**e**	**f**	**g**	**h**
2	4	6	8	10	8	6	4
+ 4	+ 6	+ 8	+ 10	+ 8	+ 6	+ 4	+ 2

Are your answers odd or even?

5. Add these odd and even numbers.

a	**b**	**c**	**d**	**e**	**f**	**g**	**h**
1	2	3	4	5	6	8	9
+ 2	+ 3	+ 4	+ 5	+ 6	+ 7	+ 9	+ 10

Are your answers odd or even?

What do you think?

1. Do you think the odd and even pattern will hold for the addition of larger numbers too? If the pattern holds true, your answers to this row of addition will be even. Find the sums to make sure.

a $\begin{array}{r} 51 \\ +\ 35 \\ \hline \end{array}$ **b** $\begin{array}{r} 357 \\ +\ 31 \\ \hline \end{array}$ **c** $\begin{array}{r} 735 \\ +\ 53 \\ \hline \end{array}$ **d** $\begin{array}{r} 555 \\ +\ 111 \\ \hline \end{array}$ **e** $\begin{array}{r} 757 \\ +\ 131 \\ \hline \end{array}$

2. Will the sums be even if you have to rename? Find out.

a $\begin{array}{r} 57 \\ +\ 13 \\ \hline \end{array}$ **b** $\begin{array}{r} 739 \\ +\ 17 \\ \hline \end{array}$ **c** $\begin{array}{r} 577 \\ +\ 53 \\ \hline \end{array}$ **d** $\begin{array}{r} 791 \\ +\ 139 \\ \hline \end{array}$ **e** $\begin{array}{r} 975 \\ +\ 197 \\ \hline \end{array}$

3. Now add to see if your answer is odd when you add evens and odds.

a $\begin{array}{r} 57 \\ +\ 24 \\ \hline \end{array}$ **b** $\begin{array}{r} 642 \\ +\ 39 \\ \hline \end{array}$ **c** $\begin{array}{r} 735 \\ +\ 88 \\ \hline \end{array}$ **d** $\begin{array}{r} 864 \\ +\ 137 \\ \hline \end{array}$ **e** $\begin{array}{r} 753 \\ +\ 248 \\ \hline \end{array}$

4. Did it make a change in the sum if the order of evens and odds was changed? Now add evens.

a $\begin{array}{r} 24 \\ +\ 46 \\ \hline \end{array}$ **b** $\begin{array}{r} 168 \\ +\ 24 \\ \hline \end{array}$ **c** $\begin{array}{r} 246 \\ +\ 28 \\ \hline \end{array}$ **d** $\begin{array}{r} 486 \\ +\ 124 \\ \hline \end{array}$ **e** $\begin{array}{r} 826 \\ +\ 184 \\ \hline \end{array}$

FIND OUT

1. What happens when you subtract odd numbers?

a	b	c	d	e	f	g	h
3	5	7	9	9	9	7	7
− 1	− 3	− 5	− 7	− 5	− 3	− 3	− 1

Are your answers odd or even?

2. Subtract these even numbers.

a	b	c	d	e	f	g	h
4	6	8	6	8	8	10	10
− 2	− 2	− 2	− 4	− 4	− 6	− 8	− 6

Are your answers odd or even?

3. But what happens when you subtract evens from odds?

a	b	c	d	e	f	g	h
3	5	7	7	7	9	9	9
− 2	− 2	− 2	− 4	− 6	− 4	− 6	− 8

4. Try subtracting odds from evens.

a	b	c	d	e	f	g	h
4	6	8	8	10	6	10	4
− 3	− 3	− 3	− 5	− 5	− 5	− 7	− 1

5. Are your answers odd or even in problems 3 and 4?

6. Will the odd-and-even pattern hold for the subtraction of larger numbers, too?

1. Think about odd and even numbers again. Look at these problems.
Will you get odd or even answers? Subtract to make sure.

a $\begin{array}{r} 79 \\ -\ 51 \\ \hline \end{array}$ **b** $\begin{array}{r} 395 \\ -\ 73 \\ \hline \end{array}$ **c** $\begin{array}{r} 179 \\ -\ 31 \\ \hline \end{array}$ **d** $\begin{array}{r} 977 \\ -\ 153 \\ \hline \end{array}$ **e** $\begin{array}{r} 753 \\ -\ 531 \\ \hline \end{array}$

2. Will you get even numbers when you subtract odd numbers that need renaming?
Here's a set of problems to help you find out.

a $\begin{array}{r} 97 \\ -\ 59 \\ \hline \end{array}$ **b** $\begin{array}{r} 353 \\ -\ 49 \\ \hline \end{array}$ **c** $\begin{array}{r} 551 \\ -\ 75 \\ \hline \end{array}$ **d** $\begin{array}{r} 931 \\ -\ 357 \\ \hline \end{array}$ **e** $\begin{array}{r} 735 \\ -\ 579 \\ \hline \end{array}$

3. Now subtract to see if your answer is odd when you subtract an even from an odd.
(There's some renaming.)

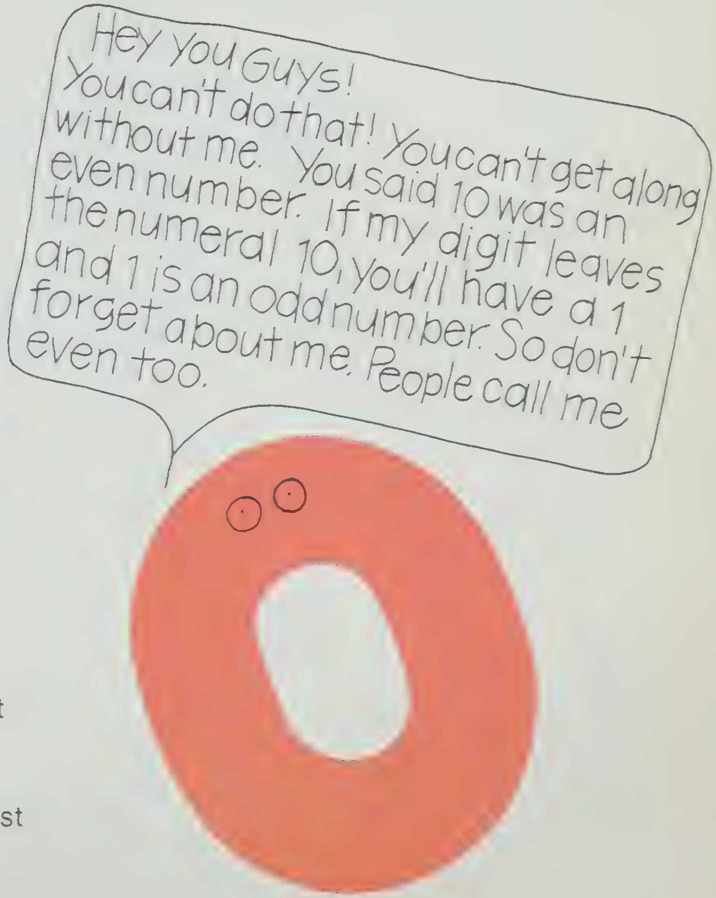
a $\begin{array}{r} 79 \\ -\ 46 \\ \hline \end{array}$ **b** $\begin{array}{r} 383 \\ -\ 62 \\ \hline \end{array}$ **c** $\begin{array}{r} 595 \\ -\ 246 \\ \hline \end{array}$ **d** $\begin{array}{r} 737 \\ -\ 468 \\ \hline \end{array}$ **e** $\begin{array}{r} 975 \\ -\ 686 \\ \hline \end{array}$

4. Now subtract odd from even. (There's some renaming.)

a $\begin{array}{r} 88 \\ -\ 57 \\ \hline \end{array}$ **b** $\begin{array}{r} 268 \\ -\ 35 \\ \hline \end{array}$ **c** $\begin{array}{r} 484 \\ -\ 55 \\ \hline \end{array}$ **d** $\begin{array}{r} 824 \\ -\ 537 \\ \hline \end{array}$ **e** $\begin{array}{r} 888 \\ -\ 733 \\ \hline \end{array}$

5. Make up five problems that show your answer will be
even if you subtract two large even numbers.

Have you noticed? Poor Zero! He didn't get in on the act.
Oh well, maybe he isn't important. Can you forget about him?



Zero is a very important number.
Think about all ten of our digits.

0 1 2 3 4 5 6 7 8 9

You can make just about any number in the whole world with these ten digits.

1. Use any one of the digits to write the smallest whole number you know.

2. Use all of the digits just once. Write the largest number you can.

3. Use all of the digits just once. Write the smallest number you can.

4. **Think** What makes one order of digits show a larger number than any other order?

It is so sad when you make a silly mistake. No one wants to make mistakes. There are some things that you can learn to help you not make silly mistakes when you are adding.

You know your addition facts, don't you? So start from there.

Look at this problem.

$$\begin{array}{r} 52 \\ +\ 43 \\ \hline \end{array}$$

You know your answer has to be less than 100. Why? About what will the answer be?

$$\begin{array}{r} 67 \\ +\ 79 \\ \hline \end{array}$$

You know this answer will be more than 100 but less than 200. Why? Can you guess about what the answer will be?

1. Look at these problems and guess what the answer will be. Don't compute. Just make a good guess.

a $\begin{array}{r} 11 \\ +\ 22 \\ \hline \end{array}$ **b** $\begin{array}{r} 38 \\ +\ 52 \\ \hline \end{array}$ **c** $\begin{array}{r} 97 \\ +\ 90 \\ \hline \end{array}$ **d** $\begin{array}{r} 20 \\ +\ 37 \\ \hline \end{array}$ **e** $\begin{array}{r} 67 \\ +\ 82 \\ \hline \end{array}$

There is no such thing as a wrong guess. But some guesses are better than others.

Time out to learn how to make a good guess.

Here is how you start.
Look at each number and **THINK.**

$$\begin{array}{r} 11 \\ +\ 22 \\ \hline ? \end{array}$$

That's close to 10.
That's close to 20.
10 + 20 is 30, so
the answer will be close to 30.

The **THINK** step is the important step.

Before you can really get good at guessing, you have to be able to add tens *and* "think" the number line. You want to find the number of tens another number is closest to. You want tens because you can work without pencil and paper. You just showed you could.

1. Answer these without using paper and pencil.

a	**b**	**c**	**d**	**e**	**f**	**g**	**h**
$\begin{array}{r} 10 \\ +\ 30 \\ \hline \end{array}$	$\begin{array}{r} 40 \\ +\ 50 \\ \hline \end{array}$	$\begin{array}{r} 60 \\ +\ 20 \\ \hline \end{array}$	$\begin{array}{r} 70 \\ +\ 80 \\ \hline \end{array}$	$\begin{array}{r} 80 \\ +\ 90 \\ \hline \end{array}$	$\begin{array}{r} 60 \\ +\ 40 \\ \hline \end{array}$	$\begin{array}{r} 70 \\ +\ 60 \\ \hline \end{array}$	$\begin{array}{r} 80 \\ +\ 80 \\ \hline \end{array}$

That proves you can add tens.
Now see if you can "think" the number line.

2. Is 17 closer to 10 or 20?

3. Is 31 closer to 30 or 40?

4. Is 57 closer to 50 or 60?

5. Is 63 closer to 60 or 70?

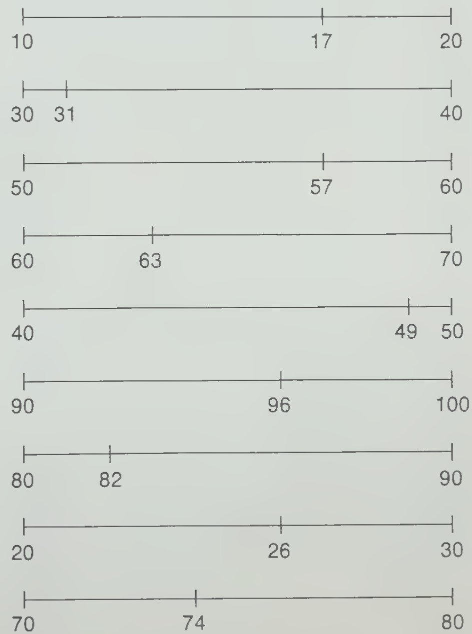
6. Is 49 closer to 40 or 50?

7. Is 96 closer to 90 or 100?

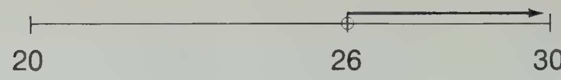
8. Is 82 closer to 80 or 90?

9. Is 26 closer to 20 or 30?

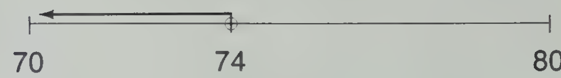
10. Is 74 closer to 70 or 80?



You just finished *rounding* numbers. You rounded a number up to a number of tens.

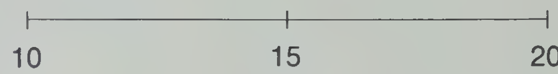


Or you rounded a number down.



There was one number that wasn't in your rounding practice.

Is 15 closer to 10 or 20?



There has to be an agreement.

> Numbers like 15, 25, 35, and 55 are halfway numbers.
> They are not closer to one ten than to another.
> Agree, please, that halfway numbers will be rounded up.

1. Now back to addition and making good guesses about the answers.

a

37 → round up to → 40
+ 42 → round down to → + 40
?

The real answer had better be close to 80. Is it?

b

52 → 50
+ 63 → + 60
? ← Close to 110. Is it?

c

89 → 90
+ 76 → + 80
? ← Close to 170. Is it?

d

91 → 90
+ 69 → + 70
? ← Close to 160. Is it?

2. Try these. First write your guess. Then find out how close your good guess is to the real answer.

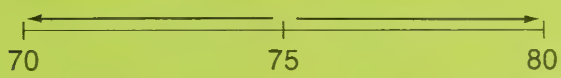
a	b	c	d	e
72	85	31	54	99
+ 47	+ 29	+ 69	+ 19	+ 38

1. Check to see how good you are at subtracting without paper and pencil.

a $\begin{array}{r} 90 \\ -\ 30 \\ \hline \end{array}$	**b** $\begin{array}{r} 60 \\ -\ 50 \\ \hline \end{array}$	**c** $\begin{array}{r} 70 \\ -\ 40 \\ \hline \end{array}$	**d** $\begin{array}{r} 80 \\ -\ 50 \\ \hline \end{array}$	**e** $\begin{array}{r} 50 \\ -\ 30 \\ \hline \end{array}$
f $\begin{array}{r} 110 \\ -\ 30 \\ \hline \end{array}$	**g** $\begin{array}{r} 150 \\ -\ 70 \\ \hline \end{array}$	**h** $\begin{array}{r} 180 \\ -\ 90 \\ \hline \end{array}$	**i** $\begin{array}{r} 160 \\ -\ 80 \\ \hline \end{array}$	**j** $\begin{array}{r} 140 \\ -\ 50 \\ \hline \end{array}$

If you know your subtraction facts, those problems are easy.
If you don't know them, the problems might be hard.

2. Now a quick review of rounding.



71, 72, 73, and 74 all round down to 70.

75, 76, 77, 78, and 79 round up to 80.

You know that segment could have been marked 10 through 20. How else could it have been marked?

3. Put the subtracting-ten skill with your rounding skill and show what good guesses you can make.

a
$$\begin{array}{rcr} 67 & \longrightarrow \text{round up to} \longrightarrow & 70 \\ -\ 38 & \longrightarrow \text{round up to} \longrightarrow & -\ 40 \\ \hline \end{array}$$

The real answer should be close to 30. Is it?

First write your guess. Then find out how close your guess is to the answer.

b $\begin{array}{r} 86 \\ -\ 49 \\ \hline \end{array}$	**c** $\begin{array}{r} 52 \\ -\ 34 \\ \hline \end{array}$	**d** $\begin{array}{r} 94 \\ -\ 57 \\ \hline \end{array}$	**e** $\begin{array}{r} 148 \\ -\ 62 \\ \hline \end{array}$	**f** $\begin{array}{r} 183 \\ -\ 79 \\ \hline \end{array}$

1. Try multiplication. Answer these. Don't write the problem.

a $\begin{array}{r} 30 \\ \times\ 3 \\ \hline \end{array}$ b $\begin{array}{r} 40 \\ \times\ 6 \\ \hline \end{array}$ c $\begin{array}{r} 50 \\ \times\ 7 \\ \hline \end{array}$ d $\begin{array}{r} 60 \\ \times\ 4 \\ \hline \end{array}$ e $\begin{array}{r} 70 \\ \times\ 7 \\ \hline \end{array}$

f $\begin{array}{r} 80 \\ \times\ 5 \\ \hline \end{array}$ g $\begin{array}{r} 90 \\ \times\ 6 \\ \hline \end{array}$ h $\begin{array}{r} 60 \\ \times\ 3 \\ \hline \end{array}$ i $\begin{array}{r} 80 \\ \times\ 7 \\ \hline \end{array}$ j $\begin{array}{r} 40 \\ \times\ 9 \\ \hline \end{array}$

2. Can you make a good guess when you multiply?

a $\begin{array}{r} 41 \\ \times\ 9 \\ \hline ? \end{array}$ THINK 41 is closer to 40 than 50. I know 9 × 40 is 360. So my answer should be a little more than 360. Is it?

b $\begin{array}{r} 73 \\ \times\ 7 \\ \hline ? \end{array}$ THINK 73 is closer to 70 than 80. I know 7 × 70 is 490. So my answer should be a little more than 490. Is it?

c $\begin{array}{r} 95 \\ \times\ 8 \\ \hline ? \end{array}$ THINK 95 is between 90 and 100. I'll use 100 to make my guess. 8 × 100 is 800. My answer should be a little less than 800. Is it?

d $\begin{array}{r} 54 \\ \times\ 6 \\ \hline ? \end{array}$ THINK 54 is closer to 50 than 60. What's 6 × 50? My answer should be a little more than ? . Is it?

e $\begin{array}{r} 69 \\ \times\ 5 \\ \hline ? \end{array}$ THINK 69 is closer to 70 than 60. What's 5 × 70? My answer should be a little less than ? . Is it?

YOU try the game

Do you need some practice in multiplication? One group decided the game of cubes was good for fun and practice, too.

They used only two cubes. They put fresh tape on the cubes. They marked one of these numerals on each face—1, 2, 3, 4, 5, 6. On the other cube they put the numeral 7 on two faces, 8 on two faces, and 9 on two faces. (They wanted the most practice on 7, 8, and 9.) They rolled the cubes. The person who had the turn had to say the product.

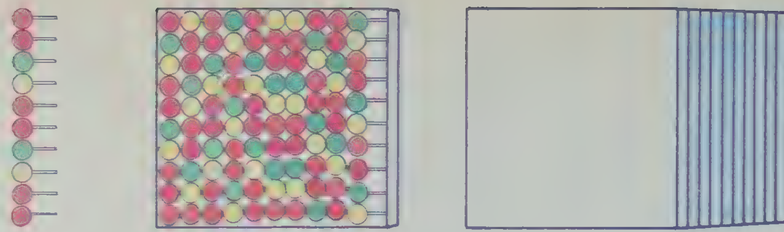
They decided not to put zero on any face of the cubes. Can you figure out why?

They decided to change the game. They got a third cube. They marked that cube with 1, 2, 3, 4, 5, 6. They rolled all three cubes. This time the person had to name the product of three factors. See how fast you could write the products for each turn.

1.	$\boxed{2}$	$\boxed{3}$	$\boxed{7}$	**2.**	$\boxed{4}$	$\boxed{5}$	$\boxed{7}$
3.	$\boxed{5}$	$\boxed{2}$	$\boxed{9}$	**4.**	$\boxed{7}$	$\boxed{5}$	$\boxed{1}$
5.	$\boxed{3}$	$\boxed{8}$	$\boxed{4}$	**6.**	$\boxed{6}$	$\boxed{3}$	$\boxed{8}$
7.	$\boxed{5}$	$\boxed{9}$	$\boxed{1}$	**8.**	$\boxed{6}$	$\boxed{7}$	$\boxed{4}$
9.	$\boxed{8}$	$\boxed{6}$	$\boxed{2}$	**10.**	$\boxed{9}$	$\boxed{1}$	$\boxed{6}$
11.	$\boxed{3}$	$\boxed{9}$	$\boxed{2}$	**12.**	$\boxed{8}$	$\boxed{4}$	$\boxed{5}$

Does it matter which two numbers you multiply first?

Wouldn't it be great to visit a lollipop factory? There are such things, you know. One factory makes strings of 10 lollipops. They put 10 strings of 10 in one box. And they put 10 boxes in just one carton.



1. How many lollipops in one box?
2. How many in the carton?
3. A candy store ordered 5 cartons. How many lollipops?
4. Debby was planning a party. She needed 50 lollipops. How many strings should she buy?
5. Each lollipop costs 2 cents. How much does 1 string cost?
6. How much does a box of them cost?
7. Here's a hard one. How much would a whole carton cost?
8. The candy store also sold candy by the bag. Each bag of chocolate candy costs \$.69.

If you bought	2 bags	3 bags	5 bags
You would pay	?	?	?

9. Hard candy costs only \$.37 a bag.

If you bought	2 bags	4 bags	6 bags
You would pay	?	?	?

1. Bob's turtle ran 89 centimetres in a race. June's turtle ran 7 centimetres farther. How far did June's turtle go?

2. They needed at least 3 metres of rope.
   - **a** Don had 250 centimetres. Was that enough?
   - **b** Ron had 300 centimetres. Was that enough?
   - **c** Jon had 450 centimetres. Was that enough?

3. Bruce stood on the scale to weigh himself. He weighed 27 kilograms. Vivian stepped on the scale beside him. The scale read 51 kilograms. How much did Vivian weigh?

4. Ken weighs 37 kilograms. Stan weighs 28 kilograms. Jim weighs 30 kilograms. How much do the three of them weigh together?

5. Neil and Kay made up 9 bags of candy for their party. They used 720 g of candy. How many grams of candy were in each bag?

6. Mac rode his bicycle 17 km in a race. Jacques rode his bicycle 7 kilometres farther. How far did Jacques go?

Remember:
There are 10 millimetres in a centimetre.

10 mm = 1 cm

There are 100 centimetres in a metre.

100 cm = 1 m

There are 1000 metres in a kilometre.

1000 m = 1 km

There are 1000 grams in a kilogram.

1000 g = 1 kilogram

There are 1000 millilitres in a litre.

1000 ml = 1 ℓ

1.

The length of a ribbon is	1 metre	2 metres	3 metres	4 metres
It also measures	100 cm	? cm	? cm	? cm

2.

The length of a string is	100 cm	200 cm	300 cm	1000 cm
It also measures	1 m	? m	? m	? m

3.

The weight of a box is	1 kg	2 kg	3 kg	4 kg
It also weighs	1000 g	? g	? g	? g

4.

A carton of milk contains	1000 ml	2000 ml	3000 ml	4000 ml
It also contains	1 ℓ	? ℓ	? ℓ	? ℓ

5. Mike is 1 m 25 cm tall.
Marilyn is 115 cm tall.
Who is taller?
How much taller?

6. The meat weighs 500 g.
The cheese weighs 1 kg.
Which weighs more?
How much more?

7. The jug holds 1 litre.
The bottle holds 1200 ml.
Which holds more?
How much more?

Multiply and divide

These problems all follow a pattern. Can you find it?

1. $\begin{array}{r} 7 \\ \times\ 6 \\ \hline \end{array}$ $\quad 7\overline{)42} \quad 6\overline{)42}$

2. $\begin{array}{r} 9 \\ \times\ 3 \\ \hline \end{array}$ $\quad 3\overline{)27} \quad 9\overline{)27}$

3. $\begin{array}{r} 8 \\ \times\ 5 \\ \hline \end{array}$ $\quad 8\overline{)40} \quad 5\overline{)40}$

4. $\begin{array}{r} 8 \\ \times\ 2 \\ \hline \end{array}$ $\quad 8\overline{)16} \quad 2\overline{)16}$

5. $\begin{array}{r} 4 \\ \times\ 9 \\ \hline \end{array}$ $\quad 4\overline{)36} \quad 9\overline{)36}$

6. $\begin{array}{r} 9 \\ \times\ 6 \\ \hline \end{array}$ $\quad 9\overline{)54} \quad 6\overline{)54}$

7. $\begin{array}{r} 4 \\ \times\ 7 \\ \hline \end{array}$ $\quad 4\overline{)28} \quad 7\overline{)28}$

8. $\begin{array}{r} 5 \\ \times\ 6 \\ \hline \end{array}$ $\quad 5\overline{)30} \quad 6\overline{)30}$

9. $\begin{array}{r} 8 \\ \times\ 7 \\ \hline \end{array}$ $\quad 8\overline{)56} \quad 7\overline{)56}$

10. $\begin{array}{r} 8 \\ \times\ 9 \\ \hline \end{array}$ $\quad 8\overline{)72} \quad 9\overline{)72}$

11. $\begin{array}{r} 6 \\ \times\ 8 \\ \hline \end{array}$ $\quad 6\overline{)48} \quad 8\overline{)48}$

12. $\begin{array}{r} 9 \\ \times\ 7 \\ \hline \end{array}$ $\quad 9\overline{)63} \quad 7\overline{)63}$

13. Make up three sets of problems like those you have just finished.

Your multiplication facts can help you with division.

1. Write all the ways you can find to fit any three of these number tiles into the division sentence.

$\boxed{?} \div \boxed{?} = \boxed{?}$

8 36 6 4 9 6 32

2. Write the different ways you could fit any three of the number tiles above into this multiplication sentence.

$\boxed{?} \times \boxed{?} = \boxed{?}$

3. This time use any three of these number tiles. How many different sentences can you find?

$\boxed{?} \div \boxed{?} = \boxed{?}$

48 7 56 9 6 8 54

4. Switch to multiplication. How many different sentences can you find?

$\boxed{?} \times \boxed{?} = \boxed{?}$

1. Pretend you are a storekeeper. Some things come in large packages. You want to sell them in smaller packages. So you repackage them. Tell how many smaller packages you would get.

Item	It comes in big package with this many inside	Number of smaller packages you want to sell	How many in each smaller package?
a candy bars	12	3	?
b soap	24	3	?
c gum	36	6	?
d light bulbs	4	1	?
e ice-cream bars	12	2	?
f lotion	6	2	?
g tissues	48	6	?

You have been dividing.
You didn't estimate this time.
You needed to know exactly how many things would go in each smaller package.

2. Here is when you might estimate.

   a Pretend you are planning a party. 8 people in all will be there. The box of cookies says there are 36 cookies in it. You want 3 cookies for each person. Will you have enough?

   b You bought a big bag of balloons. It has 12 balloons in it. Can each person have a balloon?

   c You have 6 party hats. Can each person have one?

1. There are 12 people at the party. You plan to play different games.

   a One game calls for teams of 2. How many teams would there be?

   b Another calls for teams of 3. How many teams this time?

   c Now you need teams of 4. How many teams of 4?

   d Could you play a game with teams of 6? How many teams of 6 could there be?

2. There are 15 people. Could everybody play a game that called for—

   a teams of 2? How many teams could play?

   b teams of 3? How many teams could play?

   c teams of 4? How many teams could play?

   d teams of 5? How many teams could play?

   e teams of 6? How many teams could play?

3. Now you have 20 people. Could you play a game that called for—

   a teams of 2? How many teams?

   b teams of 3? How many teams?

   c teams of 4? How many teams?

   d teams of 5? How many teams?

   e teams of 6? How many teams?

4. This one is a hard one. There are 24 people. You decide all the different team sizes you could have. Be sure you have everyone playing.

How many 2s in 18? **Think** $? \times 2 = 18$

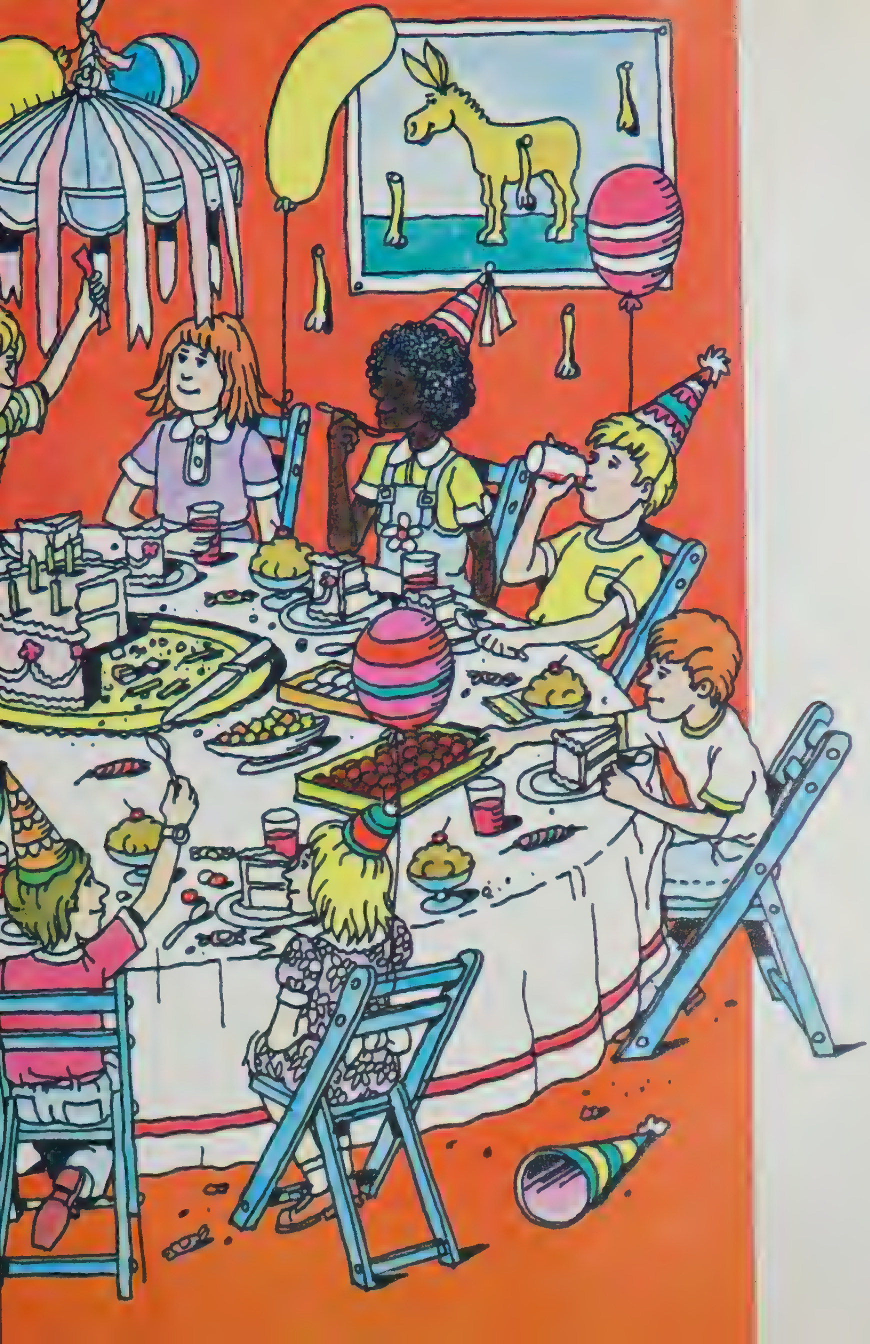
How many 4s in 12? **Think** $? \times 4 = 12$

How many 5s in 20? **Think** $? \times 5 = 20$

How many 3s in 21? **Think** $? \times 3 = 21$

Yes!

You're dividing again. Switch to the symbol for division. Save yourself some reading.



	a	b	c	d
1.	$4\overline{)28}$	$5\overline{)30}$	$2\overline{)14}$	$3\overline{)27}$
2.	$2\overline{)10}$	$3\overline{)24}$	$5\overline{)40}$	$4\overline{)36}$
3.	$1\overline{)9}$	$3\overline{)18}$	$4\overline{)24}$	$5\overline{)35}$
4.	$4\overline{)32}$	$6\overline{)42}$	$5\overline{)45}$	$7\overline{)49}$
5.	$5\overline{)25}$	$7\overline{)63}$	$6\overline{)54}$	$8\overline{)64}$
6.	$6\overline{)48}$	$9\overline{)81}$	$4\overline{)20}$	$7\overline{)56}$
7.	$8\overline{)72}$	$7\overline{)35}$	$6\overline{)36}$	$9\overline{)27}$

Think about this

$$\begin{array}{r} 8 \\ 4\overline{)32} \end{array}$$

That's right because $\begin{array}{r} 8 \\ \times\ 4 \\ \hline 32 \end{array}$

$$\begin{array}{r} ? \\ 4\overline{)320} \end{array}$$

Think How many 4s in 320?

$8 \times 4 = 32$

$80 \times 4 = 320$

$$\begin{array}{r} 80 \\ 4\overline{)320} \end{array}$$

That's right because $\begin{array}{r} 80 \\ \times\ \ 4 \\ \hline 320 \end{array}$

Watch out!

$\begin{array}{r} 6 \\ 6\overline{)36} \end{array}$ That's right because $6 \times 6 = 36$. What about $\begin{array}{r} ? \\ 6\overline{)360} \end{array}$

$\begin{array}{r} 7 \\ 5\overline{)35} \end{array}$ That's right because $7 \times 5 = 35$. What about $\begin{array}{r} ? \\ 5\overline{)350} \end{array}$

$\begin{array}{r} 8 \\ 7\overline{)56} \end{array}$ That's right because $8 \times 7 = 56$. What about $\begin{array}{r} ? \\ 7\overline{)560} \end{array}$

You try these.

a $3\overline{)24}$ $3\overline{)240}$ **b** $6\overline{)24}$ $6\overline{)240}$ **c** $5\overline{)35}$ $5\overline{)350}$

d $4\overline{)28}$ $4\overline{)280}$ **e** $3\overline{)12}$ $3\overline{)120}$ **f** $2\overline{)18}$ $2\overline{)180}$

g $4\overline{)360}$ **h** $5\overline{)250}$ **i** $4\overline{)160}$ **j** $2\overline{)200}$ **k** $3\overline{)150}$

Divide some more

	a	b	
1.	$2\overline{)4}$	$2\overline{)40}$	Don't you feel smart?
2.	$3\overline{)9}$	$3\overline{)90}$	**WOW!**
3.	$5\overline{)10}$	$5\overline{)100}$	You didn't let the extra digit fool you, did you? You know $2 \times 5 = 10$, so you know $5\overline{)10}$ also.

	a	b	c	d
4.	$4\overline{)16}$	$4\overline{)160}$	$3\overline{)21}$	$3\overline{)210}$
5.	$5\overline{)35}$	$5\overline{)350}$	$4\overline{)28}$	$4\overline{)280}$

Go slowly on the next ones. Think carefully.
Make sure your answer is reasonable.

$3\overline{)180}$ First think $\underline{?} \times 3 = 18$. Then think $\underline{?} \times 3 = 180$.

$4\overline{)240}$ First think $\underline{?} \times 4 = 24$. Then think $\underline{?} \times 4 = 240$.

You are on your own.

	a	b	c	d	e
6.	$2\overline{)120}$	$3\overline{)60}$	$4\overline{)20}$	$5\overline{)400}$	$2\overline{)180}$
7.	$4\overline{)320}$	$3\overline{)150}$	$3\overline{)240}$	$4\overline{)280}$	$3\overline{)120}$
8.	$5\overline{)300}$	$3\overline{)210}$	$4\overline{)36}$	$5\overline{)450}$	$3\overline{)27}$

This is the next step in division.

Look at this division problem.

$3\overline{)33}$ **Think** How many 3s in 33?

$8 \times 3 = 24$ Not enough.
$9 \times 3 = 27$ Still not enough.
$10 \times 3 = 30$ That's closer.
$11 \times 3 = 33$ That's it!

$$\begin{array}{r} 11 \\ 3\overline{)33} \\ -\ 33 \\ \hline 0 \end{array}$$

There is no remainder.

Here's some more.

$5\overline{)65}$ **Think** How many 5s in 65?

$9 \times 5 = 45$ Not enough.
$10 \times 5 = 50$ Still not enough.
$11 \times 5 = 55$ Guess again.
$12 \times 5 = 60$ That's closer.
$13 \times 5 = 65$ At last!

$$\begin{array}{r} ? \\ 5\overline{)65} \\ -\ 65 \\ \hline 0 \end{array}$$

$2\overline{)26}$ **Think** How many 2s in 26?

$9 \times 2 = 18$ Not enough.
$10 \times 2 = 20$ Still not enough.
$11 \times 2 = 22$ That's closer.
$12 \times 2 = 24$ Even closer.
$13 \times 2 = 26$ That's it.

$$\begin{array}{r} ? \\ 2\overline{)26} \\ -\ 26 \\ \hline 0 \end{array}$$

Maybe you can find a better way to divide.

$4\overline{)84}$ **Think** How many 4s in 84?

$2 \times 4 = 8$, and $20 \times 4 = 80$.
That saved a lot of time.
Why not subtract that 80?

$$\begin{array}{rl} 4\overline{)84} & \\ -\ 80 & 20 \times 4 \\ \hline 4 & \text{How many 4s in 4?} \\ -\ \ 4 & 1 \times 4 \\ \hline 0 & \text{Now answer.} \end{array}$$

How many 4s in 84?
Where does the answer go?

You will have time to really get good with division later.

CHECKOUT

You have taken some big steps in math.

Review the path you have taken.

1. Show you remember the numbers between 95 and 105. Write them.

2. Show you remember the numbers between 1500 and 1510. Write them.

3. Show how well you know how to add.

a $234 + 563$ **b** $527 + 453$ **c** $682 + 139$ **d** $41 + 25 + 13$ **e** $23 + 12 + 34$

4. And show how you can subtract.

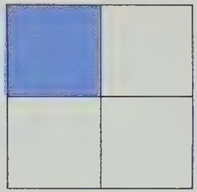
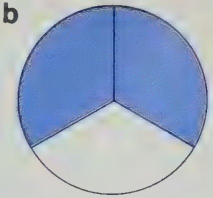
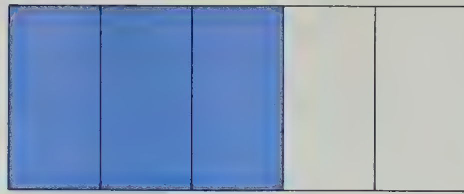
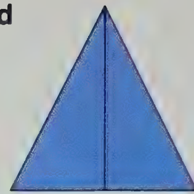
a $568 - 245$ **b** $832 - 617$ **c** $528 - 369$ **d** $608 - 475$ **e** $706 - 298$

5. Now multiply.

a 6×7 **b** 9×9 **c** 8×6 **d** 9×7 **e** 7×8

f 40×8 **g** 17×3 **h** 42×4 **i** 65×6 **j** 54×9

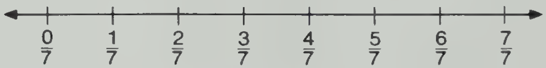
6. What fraction is shaded in each of these figures?

a  b  c  d 

7. You added fractions, too. Do it again. Use the number line to help.

a $\frac{1}{8} + \frac{1}{8}$ b $\frac{3}{8} + \frac{4}{8}$

c $\frac{2}{7} + \frac{3}{7}$ d $\frac{1}{7} + \frac{5}{7}$

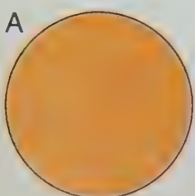
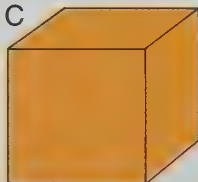


8. You learned how to use the symbols $>$, $<$, and $=$ to make sentences true.

a 5280 (?) 5820 b $\frac{8}{8}$ (?) $\frac{1}{8}$ c 0 (?) 1 d $\frac{1}{5}$ (?) $\frac{2}{5}$

e (2 + 5) + 3 (?) 2 + (5 + 3) f 250 + 125 (?) 125 + 250

9. Look at these shapes.

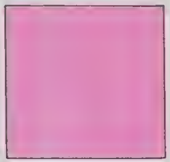
A  B  C 

a Which has both flat and curved surfaces?

b Which has flat surfaces but no curved surface?

c Which has a curved surface but no flat surfaces?

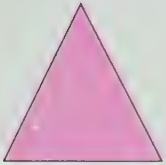
10. Look at these plane figures.



a How many sides?

b How many corners?

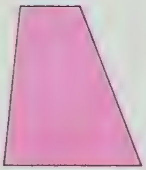
c Could this shape be folded so that one half matches the other?



d How many sides?

e How many corners?

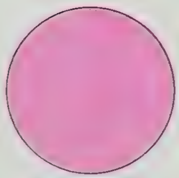
f Could this shape be folded so that one half matches the other?



g How many sides?

h How many corners?

i Could this shape be folded so that one half matches the other?

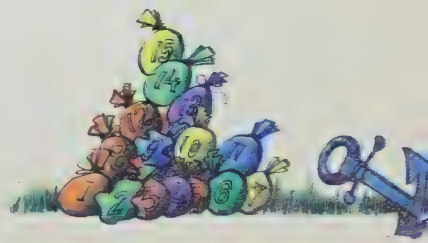


j Does this figure have any corners?

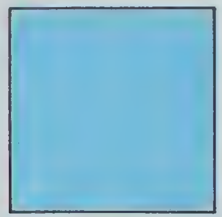
k Could this shape be folded so that one half matches the other?

You know about measurements.

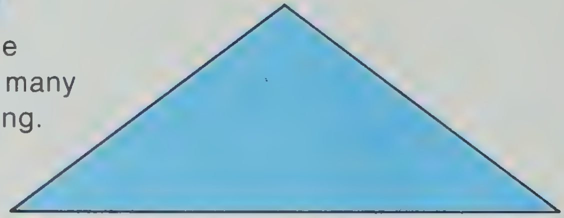
11. Is this line segment 10 mm, 10 cm, or 10 m long?

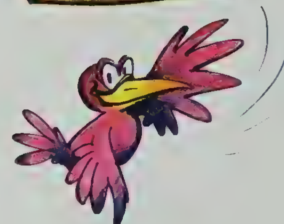


12. Tell how many cm long one side is.
Tell how many cm around the whole thing is.



13. Tell how may cm long the longest side is. Tell how many cm around the whole thing.





14. Is the height of the door in your room between 1 and 3 cm? between 1 and 3 metres? between 1 and 3 kilometres?

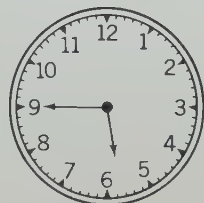
15. Do most grownups weigh between 50 and 100 grams? between 50 and 100 kilograms?

16. What time do these clocks show?

a

b

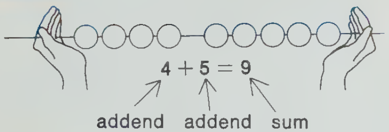
c



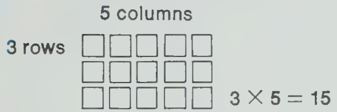
You have come a long way.
You have done a good job.

GLOSSARY

addition



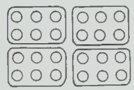
array



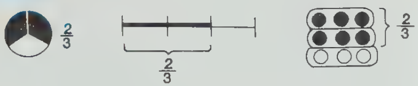
digit Any of the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

division

$24 \div 6 = 4$ or $6\overline{)24}$ with quotient 4; 24 (4 × 6); 0

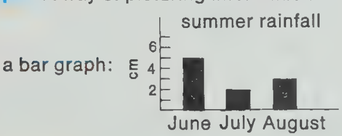


fraction A number that tells how much



$\frac{2}{3}$ ← numerator (how many parts shaded)
← denominator (how many parts in all)

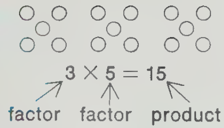
graph A way of picturing information



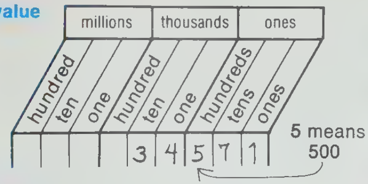
line segment A part of a line

math sentence
addition: $3 + 4 = 7$
subtraction: $16 - 7 = 9$
missing factor: $3 \times \square = 12$
division: $12 \div 3 = 4$

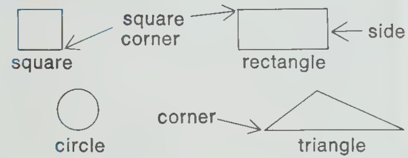
multiplication



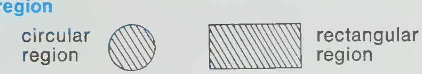
place value



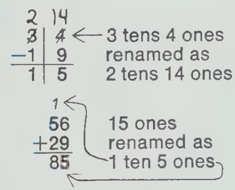
plane figure



region



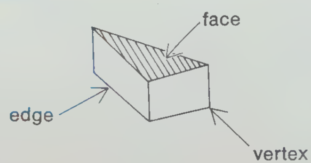
renaming



rounding

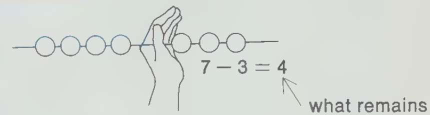
37 is closer to 40 than to 30. 37 rounds to 40.

solid object



standard unit of measure An agreed-upon length, weight, or capacity used to measure things. (See Tables of Measure.)

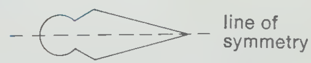
subtraction Taking away



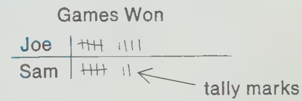
symbol

+ plus	> is greater than
− minus	< is less than
× times	= equals
÷ divided by	) division problem

symmetry Fold along the line. The two parts match.



tally chart A way to record a count



whole number Tells how many
0, 1, 2, 3, 4, 5, and the rest of the counting numbers
even numbers—0, 2, 4, 6, and so on
odd numbers—1, 3, 5, 7, and so on

INDEX

ACKNOWLEDGEMENTS

Design and Production:
Design Counsel, Inc.

Photographs:
Studio photography by Clara Aich and George L. Senty
1: Photo Researchers (Cooke). **37:** Magnum (Uzzle). **47:** Magnum (Malloch). **48:** Magnum. **83:** *l* Magnum (Arnold). **84:** Magnum (Hartmann). **97:** Monkmeyer (Shackman). **101:** Photo Researchers (Thomas). **106:** DPI (Zalon). **107:** Monkmeyer (Lanks). **109:** Photo Researchers (Angermayer). **119:** Magnum (Hartmann). **143:** Magnum (Capa). **118:** *l* Photo Researchers (Angermayer); *r* Magnum (Henriques). **145:** Black Star (Evenhon). **152:** Monkmeyer (Rogers). **163:** George L. Senty. **174:** Magnum (Lessing). **190:** Photo Researchers (Thomas). **193:** Magnum (Hartmann). **197:** Magnum (Hartmann). **199:** Magnum (Yenne). **201:** Monkmeyer (Forsyth). **217:** Monkmeyer (Fujihira). **220:** Photo Researchers (Cooke). **221:** Black Star (Ward). **233:** *tl* Monkmeyer (Forsyth); *bl* DPI (Corlett); *ml* Black Star (McCoy); *tm* Nancy Palmer Agency (Hinton); *bm* Monkmeyer (Anderson); *br* Monkmeyer (Rogers); *tr* Magnum (Harbutt). **237:** Rapho Guillumette (Johns). **238:** Suzanne Szasz. **256—57:** Monkmeyer (Forsyth). **259:** Black Star (Wilson). **283:** Magnum. **303:** Monkmeyer (Attaway). **186, 187, 188, 233, 239, 240, 241, 299:** Spectrum Educational Supplies Limited. **186, 299:** Metricaids. **299:** Scholars Choice.

Product Photographs:
77: Nabisco, Inc. **86, 88, 90, 93, 95:** The Coca-Cola Company, Dr. Pepper Company. **219:** Del Monte Corporation. **186, 187, 188, 239, 240, 241, 299:** Studio Graphics .

Trademarks:
86, 88, 90, 93, 95: Coca-Cola®, Coke®, Tab®, and Fresca® are registered trademarks of the Coca-Cola Company.

TABLES OF MEASURE

	METRIC			IMPERIAL		
LENGTH	10 millimetres (mm)	=	1 centimetre	12 inches (in.)	=	1 foot
	10 centimetres (cm)	=	1 decimetre	3 feet (ft.)	=	1 yard
	10 decimetres (dm)	=	1 metre	1760 yards (yd.)	=	1 mile
	10 metres (m)	=	1 dekametre			
	10 dekametres (dkm)	=	1 hectometre			
	10 hectometres (hm)	=	1 kilometre (km)			
AREA	100 square millimetres (sq. mm)	=	1 square centimetre	144 square inches (sq. in.)	=	1 square foot
	10,000 square centimetres (sq. cm)	=	1 square metre	9 square feet (sq. ft.)	=	1 square yard
	100 square metres (sq. m)	=	1 are	4840 square yards (sq. yd.)	=	1 acre
	100 square ares (a)	=	1 hectare	640 acres	=	1 square mile
	100 hectares (ha)	=	1 square kilometre (sq. km)	1 square mile (sq. mi.)	=	1 section (of land)
				36 sections	=	1 township
WEIGHT	10 milligrams (mg)	=	1 centigram	16 drams (dr.)	=	1 ounce
	10 centigrams (cg)	=	1 decigram	16 ounces (oz.)	=	1 pound
	10 decigrams (dg)	=	1 gram	2000 pounds (lb.)	=	1 ton (tn.)
	10 grams (g)	=	1 dekagram			
	10 dekagrams (dkg)	=	1 hectogram			
	10 hectograms (hg)	=	1 kilogram			
	1000 kilograms (kg)	=	1 metric ton (t)			
VOLUME	1000 cubic millimetres (cu. mm)	=	1 cubic centimetre	1728 cubic inches (cu. in.)	=	1 cubic foot
	1000 cubic centimetres (cu. cm)	=	1 cubic decimetre	27 cubic feet (cu. ft.)	=	1 cubic yard (cu. yd.)
	1000 cubic decimetres (cu. dm)	=	1 cubic metre (cu. m)			
CAPACITY	**Liquid and Dry**			**Liquid**		
	10 millilitres (ml)	=	1 centilitre	2½ cups (c.)	=	1 pint
	10 centilitres (cl)	=	1 decilitre	2 pints (pt.)	=	1 quart
	10 decilitres (dl)	=	1 litre	4 quarts (qt.)	=	1 gallon (gal.)
	10 litres (l)	=	1 dekalitre	1 Imperial gal.	=	1.25 U.S. gal.
	10 dekalitres (dkl)	=	1 hectolitre	**Dry**		
	10 hectolitres (hl)	=	1 kilolitre	2 pints (pt.)	=	1 quart
				8 quarts (qt.)	=	1 peck
				4 pecks (pk.)	=	1 bushel (bu.)

M. Vere DeVault
Helen Frehmeyer
Herbert J. Greenberg
Stanley J. Bezuszka

Reorder No. 3-207763
ISBN 0-574-07763-4